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COMMON INFECTIONS OF THE FEMALE URETHRA AND CERVIX

FRANK KIDD & A. MALCOLM SIMPSON

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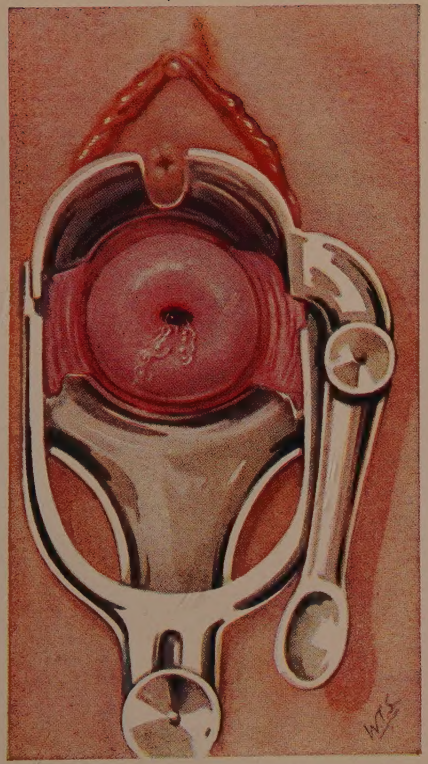
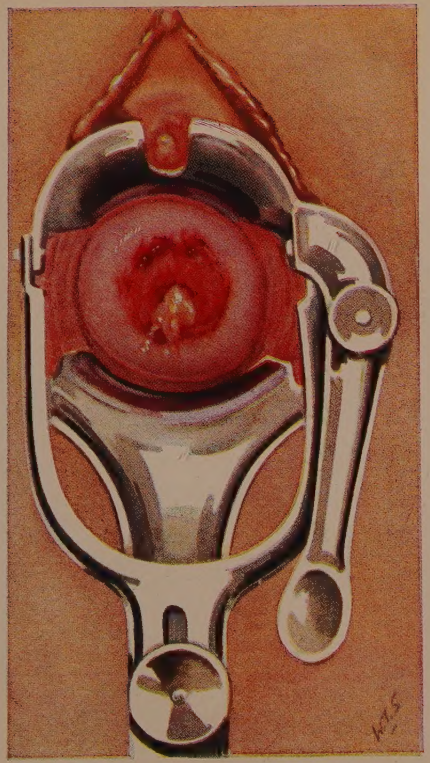
OF THE
FEMALE URETHRA
AND CERVIX

A list of books and papers by
Mr. Frank Kidd will be found
at the end of the volume



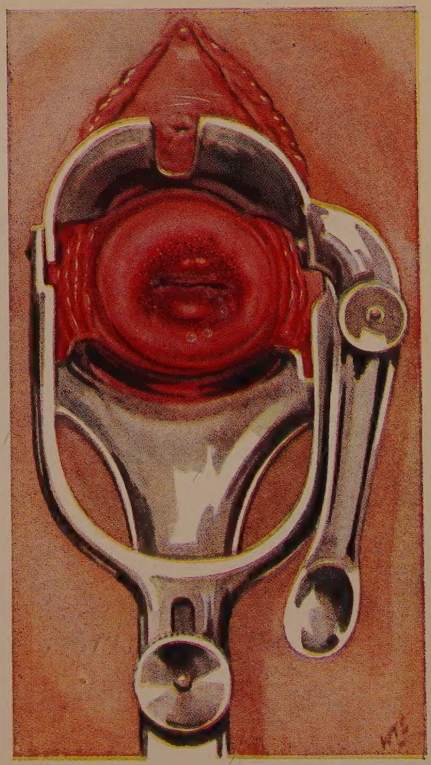
a

Healthy Cervix.
Normal Secretion.



b

Acute Cervicitis.
Purulent Secretion.



c

Chronic Cervicitis.
"Erosion"

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COMMON INFECTIONS OF THE FEMALE URETHRA AND CERVIX

BY

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HUMPHREY MILFORD

OXFORD UNIVERSITY PRESS

London Edinburgh Glasgow Leipzig New York

Toronto Melbourne Capetown Bombay

Calcutta Madras Shanghai

1929

First Edition . . . 1924
Second Edition . . 1929

24.A.483.

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Printed in Great Britain

PREFACE TO SECOND EDITION

In bringing out a second edition of this book we have not seen cause to alter the original chapters. The methods therein described have stood the tests of time and experience, and have become recognized as sound and effective. We have added another chapter describing how to hasten on the time of cure by more intensive treatment, and mentioning certain improvements in technique.

We would venture once again to call special attention to the chapter on gonococcal arthritis advocating treatment by early active movements of the joints themselves and condemning the use of splints and plaster. There are still too many cripples to be seen as the result of the splint and plaster treatment.

The Department at the London Hospital is shortly to be enlarged and placed, we hope, on a surer foundation. The seeds we have sown are bearing their fruit in due season.

F. K.
A. M. S.

October, 1929.

PREFACE TO FIRST EDITION

Following on the Report of the Royal Commission on Venereal Diseases in 1916, the London County Council approached the London hospitals with a view to establishing venereal clinics. Ever since 1910 I had organized as a private venture a few small rooms lying adjacent to my surgical out-patient room at the London Hospital for the specialized treatment of venereal disease in the male. Up to that year the diagnosis and treatment of venereal diseases had been promiscuous and unorganized; the cases might drift to any department, and were seen impartially by physicians, surgeons, or gynaecologists. Under the existing arrangements little systematic effort could be made either to carry out organized treatment, to follow up the cases adequately, or to instruct students in the knowledge of what are, after all, some of the commonest diseases met with in practice. Students were taught to recognize the obvious early or late manifestations of these diseases; but if a student went into practice, or contracted the disease himself, he discovered with profound mortification that he really had no practical knowledge of how to set about obtaining a cure.

As a result of these and previous years' special study of venereal diseases, I prepared a report for the Royal Commission on Venereal Diseases which I believe helped to open the eyes of the Commissioners to the need for waking up the teaching hospitals, and inducing them to take notice of these common diseases, speaking as I did from within and as a hospital teacher.

When the County Council approached the London Hospital, I was prepared to put forward proposals for establishing a venereal clinic at the hospital. I had always held that gonorrhoea should be treated in a portion of a genito-urinary department, as it is too small a subject to be made a study by itself, and a genito-urinary surgeon can organize its treatment with a wide view as to its relationship to surgery and to other diseases of the genito-urinary tract. Early syphilis should go to the Skin Department, as it gives that department a living wage and a wider outlook. I offered the gynaecologists to give up gonorrhoea in women to them if they wished it, or to link

up with them. They stated that they did not wish to organize a section for dealing with this most common and important disease in women. I thereupon told them that I considered the subject of such importance to stricken individuals and their families and to the community at large that I was anxious to organize a section in my Genito-Urinary Department for dealing with gonorrhoea in women and children, and to this I obtained the consent of the Medical Council and the House Committee.

We started in January 1917 in a single small room, Dr. Malcolm Simpson and I, but, owing to my various duties at the time, it was impossible for me to do more than organize this section, and it was clear that I needed a fellow worker who would work in with my ideas and who already had an extensive practical knowledge of venereal diseases in the male. Such a helper was ready to my hand in Dr. Simpson: no one ever had a more loyal and eager colleague. He and I put our heads together, and as we could find very little in the literature to help us, save for the book of Norris, we decided to embark on a clinical research of our own and see what we could do by systematic study to trace the gonococcus to its lair in the female, just as we had trained ourselves to do by many years' patient study of the infected male. The results of this research, extending over five years, are given in this book. The cases on which it is based have been analysed, and the results of the analysis are printed at the end of the book so that all may see the results.

Our study of the male had taught us that the gonococcus lying free on a mucous membrance could be destroyed in a very short time by suitable antiseptics applied to that mucous membrane, and that the cause of persistent infection and relapse was that the gonococcus retired up into some or all of the natural side-channels or glands of the male urethra, such as the follicles of the anterior urethra, and the prostate and vesicles of the deep urethra. There they could lie dormant and were only to be rooted out by painstaking observation of their lairs, and by considered treatment calculated to eradicate them therefrom. We felt sure that the same must hold good of the female.

We had first to study a large number of cases of gonorrhoea in the female and to find out in what side-tracks the gonococcus

lurked, and then decide how to dislodge it from these side-tracks. We had proved that gonorrhoea in the male could *always* be cured by painstaking observation and by regular and systematic treatment. We felt sure that the same would be found to be true of the female. We could not sit down and fold our hands as those of former days had done, and say that gonorrhoea in the female was incurable. As a matter of fact we have found that it is even more readily cured in the female than in the male, as our records will show. Without doubt in the course of time better and quicker methods of treatment will be discovered, but in this book we profess to do no more than to show how we have tackled our problem, and to envisage the actual results of a large number of cases of female gonorrhoea completely cured, and *that by comparatively simple methods—methods which are almost entirely within the scope of the general practitioner* if he will but read and inwardly digest and then practise what is here written. This book will have failed in its purpose if it fails to convince the general practitioner that he need no longer be afraid to tackle a case of female gonorrhoea.

We started by drawing up a systematic method of diagnosis. I laid down as the first rule that we should give up the system common in England of examining women in the Sims position. This has been the curse of English gynaecology. I said that we must place the patient on her back with her legs widely separated and suspended on leg-rests, as was the position I had long previously adopted in cystoscopy, having learned the method abroad. Having placed the patient in this position we should place head-lamps on our heads, and actually see what we were doing instead of poking about with our fingers into a deep and hidden cavity in the hopes of feeling something. Here again progress in medicine consisted in replacing the sense of touch by the sense of sight.

I laid it down as a rule that all doctors and nurses working in the clinic should wear rubber gloves, so as to prevent the risk of catching syphilis on the fingers. This was a great step in advance, and one that we found quite practical as soon as we insisted upon it. Digital chancres, a common occurrence in doctors at 'out-patients' in the old days, ceased to trouble us.

We then decided that we would call to our aid an expert bacteriologist, and would test every case both for diagnosis and

for cure by the most exact bacteriological methods obtainable. We were lucky enough to enlist the help of Dr. Western, of the London Hospital, for whose painstaking care in the culture and microscopic investigations we cannot be too deeply grateful. All our cases of cure have been tested by him, using the most exact bacteriological methods. We would emphasize that this co-operation between the clinical and laboratory worker has been advantageous to both parties, and has enabled Dr. Western to write the paragraphs on the localities to be examined for the presence of gonococci on pages 6 and 7 in the 'Medical Research Council's Special Report Series', No. 19 (revised), 1923.

We decided that we would examine each portion of the female genito-urinary tract step by step, and find out just what parts are commonly infected and in what proportion. Then we would treat those portions and watch the reaction to treatment. We knew more about urethral infection than cervical infection when we started, so we decided to employ urethral irrigation into the bladder, a method that had served us well in the male. We manufactured a special glass urethral nozzle by means of which, attached to a douche bag, it was possible for females to irrigate their own urethras and bladders. We gave most careful printed directions, and the method worked quite well. Later, as we organized the clinic better, we found that we were able to arrange for the patients to come up daily and receive their urethral and vesical irrigations at the hands of trained volunteer nurses, so that quicker results could be obtained.

Our first case I can never forget. She was a poor woman whom we found in the medical wards of the hospital, taken in at first as acute rheumatism, but in a few weeks proved to be a case of gonococcal arthritis. After the first few irrigations of her urethra, carried out by herself, her joints improved, and in a very short time we had the pleasure of seeing her regain the use of her limbs and return to an active life. This at once put us on to the fact, proved later, that gonococcal arthritis in the female takes origin from the urethra or cervix, and at once reacts to urethral irrigation or cervical paintings.

The department grew apace. Cured patients sent round the word, and we soon found ourselves overwhelmed with cases. We were able to give up our single room and migrate to larger

premises, where we were able to employ clinical assistants and to deal with an increasing clientele. Gradually it became the custom to send to us cases of leucorrhoea who applied on that score to the receiving-room of the hospital. Previously these cases had gone to the gynaecologists. Now the gynaecologist was ready to welcome our expert examination of the female genito-urinary tract for the lurking gonococcus before referring to him those that did not harbour that germ. More than 60 per cent. of our cases of leucorrhoea proved to be non-gonococcal, and many of these we sent on. But, as will be seen, many of the simpler cases we were able to cure by our methods of treatment. The whole secret was that we really exposed the parts of our patients to an adequate examination under the sight of the eye and under the control of the bacteriologist.

The female section of our venereal clinic at the London Hospital was one of the first clinics to be put in working order. We received visits from many of the men whose duty it was to start venereal clinics at the hospitals in London and in the provinces. In this way it became a centre of teaching and inspiration to other workers in the field and helped them to make a start on sound lines. Some of those who are now running clinics themselves worked as clinical assistants in our department for a time. We always employ at least two or three clinical assistants working under Dr. Simpson for six months at a time. In this way the ideas initiated in this department have obtained circulation, not only in English clinics but in the Colonies and in India. Many practitioners also visit us and pick up ideas for use in their practice. The establishment of the clinic has thus already more than justified its existence as a teaching centre.

We should like to express our gratitude for the devoted care of Sister French, one of the surgical sisters to the out-patient department. From the first she realized that we were after a big thing, namely, to care for fallen women, many of them married women and wives of soldiers, and for innocent infected children. No trouble could be too great for her in seeing that the department was kept in running order, and in enlisting the services of volunteer nurses to help in the work. She was kindness itself to the women, and never let them think that she looked upon them as social outcasts.

We would also like to thank Miss G. Milne, Sister of Blizzard Isolation Ward, into which we are now able to admit our severe cases of arthritis. She has sympathized with our work and our patients, and has done everything possible to facilitate their progress.

We have had many difficulties to contend with, and the fight against the prejudices of the pious has been a hard one. Nevertheless, the time has arrived, after a fifteen years' struggle, when the Hospital Authorities are willing to look upon venereal diseases as on the same plane with other diseases, and the Hospital can face the world true to its motto—'Homo sum, humani nihil a me alienum puto.'

Note.—In November 1921, with the greatest regret, Mr. Frank Kidd had to resign his post as head of the Genito-Urinary Department of the London Hospital, a department which he had been privileged to found. Owing to the pressure of other duties he found he could no longer give his whole-hearted attention to the department, so that he preferred to resign rather than carry them out in a partial manner. His place was taken by Mr. Hugh Lett, C.B.E., F.R.C.S., one of the surgeons to the London Hospital, under whose direction the department still flourishes. The authors wish to convey their thanks to Mr. Lett for leave to publish the results given in this book, and for giving them full access to the case-records.

F. K.

1924 A. M. S.

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COMMON INFECTIONS OF THE FEMALE URETHRA AND CERVIX

CHAPTER I

GENERAL DIAGNOSIS

How to examine a Woman suspected of Gonorrhoeal Taint, so as to determine the Presence or Absence of Infection, or the Fact of Cure.

Case-taking

The card used in our clinic (Fig. 1), designed for the taking of case records, contains headings needed for administrative purposes; but the clinical portions have been found to work well in practice. Using this card, a student can begin to examine his cases along sound lines, and so teach himself.

The History of the Patient

Do not neglect to take a careful history. Try to obtain a rough idea of the approximate time when the patient began to notice any unusual appearances or symptoms, such as any increase in the amount, or any alteration in the colour or character, of the vaginal secretion, and also as to whether she has noticed at any time pain or burning during micturition. Ask if these symptoms came on shortly after any particular sexual act.

If the woman is unmarried, many doctors hesitate to ask for details, but there need be no false modesty on these matters. There is little difficulty in tactfully asking an unmarried girl who applies for treatment whether she has made a false step. In dealing with the modern girl who applies for treatment, the chances are that she has done so, and is longing to unburden her soul about it. Repression may be doing her great harm. If the doctor is a decent human being of a sympathetic understanding, and if a truthful answer can be obtained, as it usually can, it saves all sorts of difficulties and misunderstandings later in the case, and it gives the patient confidence to feel that she can unburden herself to the doctor if she is in

trouble, and that he will help her if possible to put things straight and encourage her to get on the right path again. In

LONDON HOSPITAL. 3. F.

IDENTIFICATION NO	DISEASE	COUNTY OR COUNTY BOROUGH	DISTRICT, TOWN OR VILLAGE

TREATMENT COMMENCED	DATE OF DISCHARGE	SEX	AGE	DAYS OF TREATMENT	DAYS IN WARD	DAYS IN CLINIC

PATHOLOGICAL EXAMINATION.

DATE	MATERIAL	REPORT	DATE	MATERIAL	REPORT	DATE	MATERIAL	REPORT

SUMMARY OF CONDITION ON ADMISSION	SUMMARY OF CONDITION ON DISCHARGE

MARITAL STATE	HOW LONG MARRIED	PREVIOUS ATTACKS OF GONORRHŒA	PREVIOUS ATTACKS OF SYPHILIS
GONORRHŒA IN CONSORT	SYPHILIS IN CONSORT	APPROX DATE OF INFECTION	FIRST APPEARANCE OF SYMPTOMS

PREVIOUS TREATMENT—AND BY WHOM

REMARKS

HISTORY OF PREGNANCIES IN—PATIENT WIFE MOTHER

YEAR	RESULT	YEAR	RESULT	YEAR	RESULT	YEAR	RESULT	YEAR	RESULT	YEAR	RESULT

HISTORY OF PRESENT ATTACK.

DATE OF LAST COITUS	DATE WHEN DISCHARGE APPEARED

USUAL HABITS AND PRECAUTIONS

FIRST EXAMINATION.

Discharge	Amount	Character
Urine		
Vulva		
Bartholini's glands		
Urethra		
Vagina		
Cervix		
Uterus and adnexa		
Rectum and anus		
Lymphatic glands		
Other organs affected and condition		

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FIG. 1.—Card used for

dealing with men, we can usually get at the main facts without beating about the bush, and it is a great gain. The doctor will soon learn to get the main facts out of a woman too, and unless he does so he cannot really be treating the patient, but simply be treating the disease. Moral delinquencies leave scars on the mind, which can be ameliorated by kindly wisdom. A success-

ful venereal specialist needs to have a working knowledge of neuro-psychology.

N B – When treatment arrives at a double line patient must be seen by Chief or Head Clinical Assistant

DATE	TREATMENT	DISCHARGE	URETHRA	VAGINA	BARTHOLIN'S GLANDS	CERVIX	URINE	OTHER COMPLICATIONS	URETHROSCOPE
									DATE
									DATE
									DATE

case-taking.

Inquiry should be made into the menstrual history for irregularities and pain, into the questions of sterility, partial or complete, of miscarriages, of attacks of peritonitis, of painful defaecation, as to the occurrence of ophthalmia in the children (if any), and as to any present or past history of 'rheumatism', or painful or swollen joints.

Physical Examination

The patient should have held her water some hours, and should not have employed a vaginal douche during the previous twenty-four hours.

The patient is placed in the position shown in Fig. 2. The doctor sits in front of her with a head-light on his forehead and wearing rubber gloves. On the right hand is a surgical table containing the necessary instruments (see list [1]), which, having been boiled, are laid out by the nurse in antiseptic lotion (carbolic 1/200 or oxycyanide of mercury 1/4000). Each doctor needs a nurse in attendance, who should also wear rubber gloves, and whose duty it is to sterilize and make ready the instruments between each examination (Fig. 3).

It is difficult in this kind of work at a clinic for a doctor to write out his own notes, so that a secretary or a student is required to take down notes from dictation. At our clinic we have one secretary who is able to take notes for two men or women working simultaneously, and who looks after the filing of the notes and attends to the follow-up.

Though it is possible to get a good view of the external organs by ordinary daylight, the deeper parts can only be inspected satisfactorily by means of artificial light and special instruments. Electric light makes white appear yellow, and therefore gives a fallacious appearance as of thin pus to the normal urethral secretion, which the trained observer soon learns to discount with the aid of the microscope. If a head-lamp is not available, a fair view of the cervix can be obtained by placing the examining chair near to and facing a window, the examiner sitting with his back to the window.

Mop-holders, 3 to 6.
Playfair's probes, 6.
Urethral probes, 3 to 6.
3-inch urethroscope tubes 18/20 Charrière, 2.
A set of dilators Charrière, 20/30, or Hegar's, 5/10.
Cusco's speculum or Brewer's modification.
Fergusson's specula, 2.
Lucey's wire retractor speculum.
Pipette with rubber teat for treating children.

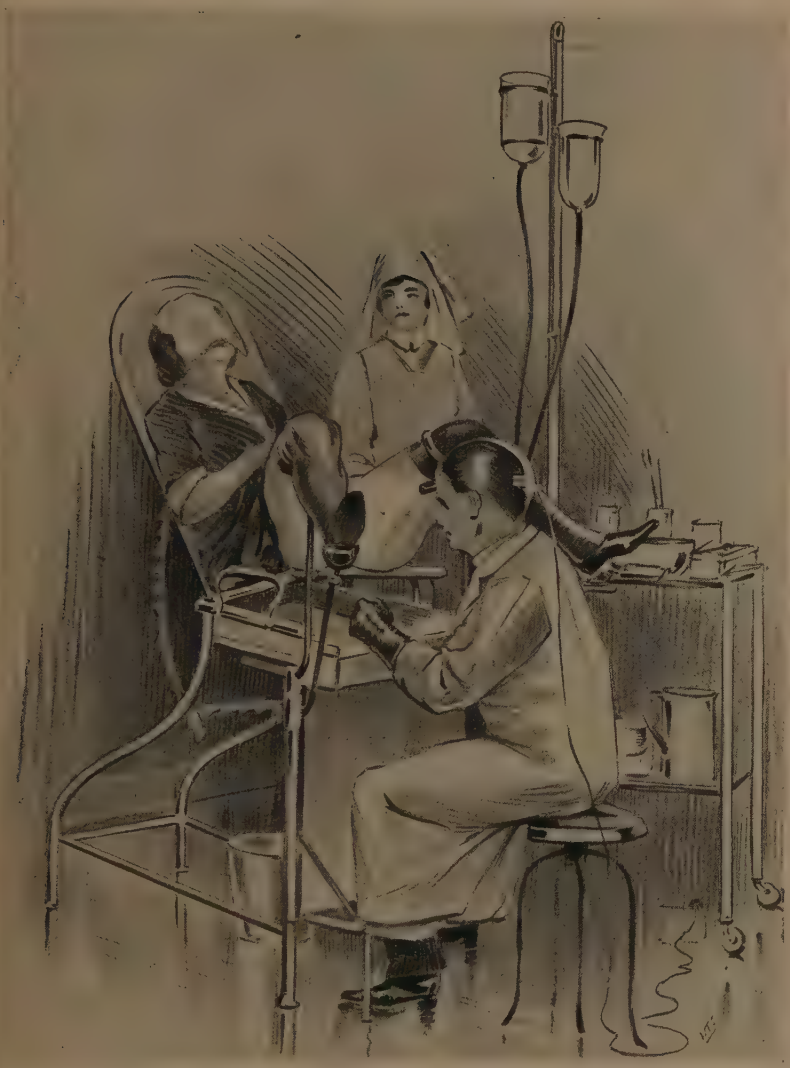

FIG. 2.—Position of patient during examination.

Abdominal Examination

The observer starts by making an abdominal examination, looking out for areas of deep tenderness and resistance, for swellings of the pelvic and other abdominal organs and of the

inguinal glands, and for rashes on the skin. The peculiar feel of the inguinal glands in early syphilis is of the utmost value in setting him on the track of a chancre. Adenitis secondary to a pure infection with the gonococcus is almost unknown. If the inguinal glands are enlarged, tender, or inflamed, he can

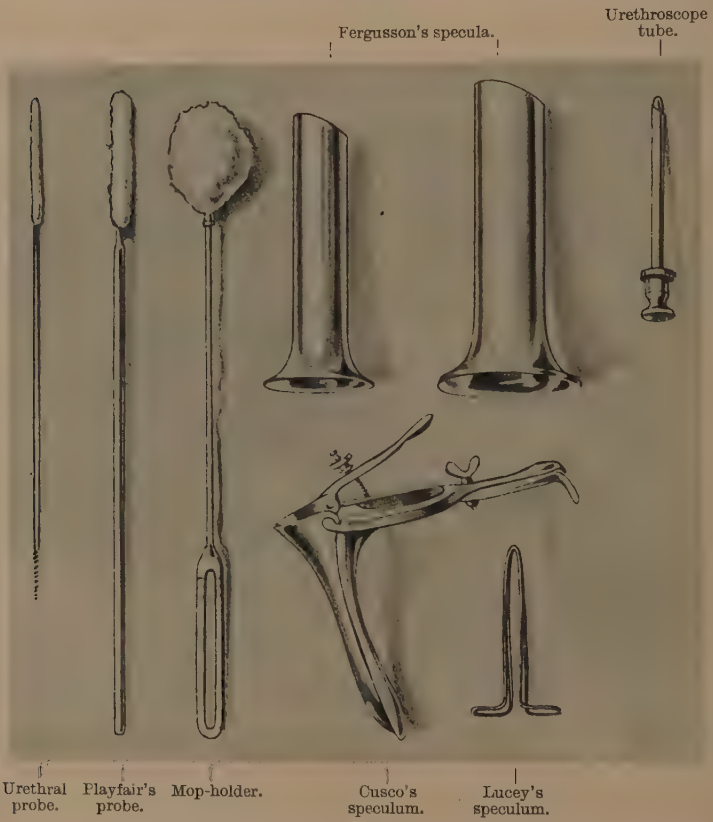

FIG. 3.—Instruments used for examination and treatment.

be sure that some other disease or complication is present, and therefore keep a sharp look out for it. Of enlarged inguinal glands, syphilis is the most likely cause, but others are uncleanliness, impetigo, 'soft-sore', and malignant disease.

Inspection of the External Genitalia

Note the amount and character of the vaginal secretion. Is it excessive, and, if so, is it simply an excess of the clear or

milky mucus natural to the parts: or is it of an opaque white or yellow colour; and has it a foul or unnatural odour? Test this secretion with litmus paper. Healthy vaginal secretion is strongly acid. If the secretion is only faintly acid it is probably pathological. If it is alkaline it is undoubtedly pathological.

In dealing with adults it is a complete waste of time to make smears and cultures of the vaginal and vulval secretions, except for a man who is learning his work. A few slides of these secretions examined under the microscope will soon convince him that the normal secretions of vulva or vagina contain squamous cells and large bacilli of Döderlein; or, if slightly pathological, a mass of bacteria and fungi, to disentangle which by cultural methods is a waste of time, most if not all being non-pathogenic. Yet in taking the history it is common to be told that some doctor has sent a specimen of the vaginal secretion to a laboratory, and on the strength of a single report has assured the patient that she cannot be suffering from gonorrhoea. Such perfunctory examinations are valued at their true worth by prostitutes, who nevertheless make use of such reports to delude their victims.

The condition of the hymen should be noted. Though a ruptured hymen is not an absolute proof that a woman has had relations with a man, yet its condition yields a pretty shrewd idea as to whether an unmarried girl has been astray often, or on only a few occasions, and will give an idea of the girl's character. Long, pulled-out, and hypertrophied labia minora in girls ('spaniel's ears') suggest habits of masturbation. Masturbation also produces characteristic shallow red rubbed areas on the outer portions of the cervix, and about the entrance to the vagina. On the other hand, an unruptured hymen is no proof of virginity or of non-infection. For instance, a man or boy may have tampered with a young girl and only penetrated as far as the hymen without rupturing it, and yet may have planted the seeds of gonorrhoea, syphilis, and a child.

Inspection of the Vulva

Separate the labia majora and inspect the vulva.

Pay attention to the colour of the mucous membrane, the presence or absence of erosions, ulcers, pustules, boils, papules, condylomata, leukoplakic patches, warts, and swellings of one

or both labia majora. A swelling of the labium majus may be due to inflammation caused by the presence of an ulcer on the inner surface, to a swelling of Bartholin's glands, to a suppurating haematoma or an inflamed hair follicle. An ulcer may be specific or due to friction and mixed infection.

Ulcers met with on the Inner Surface of the Labia Majora

1. Friction and mixed infection.
2. Syphilis—primary chancre, secondary condyloma, tertiary gumma.
3. Multiple 'herpetic' ulcers.
4. Soft-sores.
5. Serpiginous ulcer with overgrowth ('pudendal granuloma').
6. 'Phagedaena', or gangrenous ulceration.
7. Epithelioma.
8. Tuberculosis.

In children, multiple small aphthous ulcers of no depth are often encountered, and also, as a result of dirt, large symmetrical opposed shallow ulcers. For a further consideration of pudendal ulcers, see pp. 32–34.

Swellings of Bartholin's Glands

These may be acute or chronic, and may consist merely of a ductitis, a ductitis with retained mucoid cyst, an obliterated duct with retained mucoid cyst, a muco-purulent infection of the gland draining through a patent duct, or an abscess with a closed duct.

It has been taught that a swelling of Bartholin's gland is pathognomonic of gonorrhoea. This is false teaching. During the earlier weeks or months of marriage there often arises a swelling of one or both Bartholin's glands. This is associated with mild sepsis set up by rupture of the hymen, and attrition of the narrow vagina; or may be due to excessive secretion from stimulation, with temporary blockage of the duct (similar to galactocele). It is on the same footing as 'pyelitis of the marriage bed', and should not necessarily lead to suspicion of premarital infidelity or to accusations of latent gonorrhoea in the husband.

Note the position of the openings of Bartholin's ducts. These open at the junction of the middle and inferior thirds of the

labia minora on their inner side. In the case of inflammation of these ducts a characteristic red circle often appears around the opening of the duct which, once seen, can always be recognized in future cases (macule of Sänger). It has been called the gonorrhoeal macule—an unfortunate term, as it is not necessarily always gonorrhoeal, though it often is so. For instance, in 650 cases eight presented a typical macule that was not gonococcal. The macule is so helpful a point in clinical diagnosis that a coloured picture is shown. In a number of cases the opening of the duct will appear as a mere red spot, not amounting to a macule, on the surface of the inflamed mucous membrane as a part of a general punctate erythema. This disappears in a few days when the vulva and vagina are painted with flavine, and should not be taken as definite evidence of infection of the duct or gland.

Enlarged glands of Bartholin can be palpated by the thumb and index finger within the lower portion of the labia majora. Massage of the glands when chronically inflamed can be carried out, and a specimen of the secretion exuding from the duct be obtained for examination if the orifice is not completely blocked. In some cases the duct is blocked, and the swelling may be a sterile retention cyst or a commencing abscess.

The duct of the gland can be probed with a fine No. 1 lachrymal duct probe, and injected with a fine blunt, hollow needle (No. 23 gauge). In some cases of Bartholinitis pus containing gonococci can be squeezed out of the duct, a cannula slipped in, and the duct washed out with 2 per cent. flavine, after which, if the enlarged gland be squeezed, a clear mucoid jelly will burst forth, which contains neither pus nor gonococci. These are cases of mucoid retention cyst secondary to an infective ductitis, and are rapidly cured by flavine washes applied to the duct. Probably many cases of so-called Bartholin's cyst are of this type, only that the ductitis has cleared up naturally in the course of time and led to fibrous blockage of the duct, partial or complete. In 223 cases of gonorrhoea, disease of Bartholin's glands was found in 30 (13 per cent.). In 382 non-gonococcal cases, disease of Bartholin's glands was found in 27 (7 per cent.).

Examination of the Urethra

This should be carried out before there has been any interference with the vagina or cervix.

Inspection of the mouth of the urethra may reveal abnormal redness, puffiness, oedema, and eversion or prolapse of the lips of the meatus. Pus may sometimes be seen exuding spontaneously from the orifice, and a look out should be kept for 'caruncles', polyps, and para-urethral follicles. A para-urethral follicle consists of a blind pit or channel exuding a bead of pus, and into which a fine probe can be inserted for a varying distance. The orifice may become partially or completely blocked, with the consequent formation of an inflammatory swelling filled with pus, but lined by epithelium, and therefore not a true abscess. In multiparae the margins of the urethra are often patulous and everted or prolapsed, so that the mouths of Skene's tubules may be seen on the floor of the urethra just within the meatus. Pressure may cause pus to exude from them, and their orifices can be explored and dilated with a fine probe. Only two cases of Skenitis were encountered in 650 cases, one of which was specific and one non-specific, so that its importance can easily be exaggerated. Mere eversion and redness of the urethral mucous membrane are common, and are not necessarily pathological.

Palpation of the Urethra

The urethra can be felt as a firm cord lying beneath the vaginal mucous membrane. With the index finger of the left hand milk the urethra from behind forward, take up any secretion appearing at the meatus on a platinum loop, and make two films on glass slides suitably labelled, which should be lying ready on the surgical table. If no secretion appears, *gently* insert the platinum needle into the urethra, pick up any secretion that may be lying within the urethra, and make films. These films are stained and examined for pus cells and gonococci and other organisms. When the question of cure arises, cultures are made in addition to the films. Instead of a platinum needle a sterilized capillary pipette, with a rubber sucker attached, can be used for sucking up secretion and making films and cultures.

Examination of the Urine passed into Two Glasses

At this point I advise as follows (though it is not part of the routine examination in the clinic): Gently sponge over the mucous membrane in the region of the urethra with a pledget of cotton wool, so as to remove any excessive secretion. Then retire for a few moments so that the patient may pass water into two glasses. This can often be done by the patient as she lies on her back, the nurse holding the glasses in place just beneath the meatus, with the labia widely spread. If the patient cannot manage in this way, then she should be asked to rise from the chair, to stand with legs apart and labia held separated, and to pass water vertically into two separate glasses placed on a stand between the legs.

It is not always recognized that females can pass water standing, in a vertical, well-defined stream, just like a man, but it is so, and advantage can be taken of the fact. Burton, in his edition of the *Arabian Nights*, points out that Arabian women always urinate standing, whereas Arabian men do so in a sitting posture.

What can be learnt from the two-glass test?

1. If the urine in both glasses is absolutely clear and contains no threads, it is not likely that the urethra is inflamed, a result which can be co-ordinated with the result of the urethral smear.

2. If the urine in the first glass contains threads and a haze of pus, and in the second is clear, urethritis is present (whether gonococcal or non-specific will be determined by the urethral smear), but there is no cystitis. In acute urethritis a burning sensation is felt directly micturition begins, and is felt throughout the act. In chronic urethritis there may be no subjective sensations of pain on micturition nor increased frequency of micturition.

3. If the urine in both glasses[1] is cloudy with pus, then there is present either a very profuse urethritis or a cystitis. A diagnosis of cystitis can be confidently made if there is greatly increased frequency of micturition with *severe pain at the end*

[1] Pour a hazy urine into two glasses. Add to one of them acetic acid, and if the haze disappears it is caused by phosphates. Add to the other 10 per cent. potassium hydrate, and if it disappears it is caused by urates. If it does not disappear in either glass, it is caused by pus or bacilli, facts which can be confirmed by microscopic examination.

of the act. This is opposed to the symptoms of urethritis, in which frequency may not be unduly increased and the burning sensation is felt *throughout the act* of micturition. Nevertheless, many cases of increased frequency of micturition unattended by pain or pyuria are due to a chronic trigonitis or deep urethritis.

If 'cystitis' is present, it is hardly ever due to the gonococcus but to other bacteria, either primary, or secondary to the use of septic instruments or lotions. Either septic instruments have been passed and a secondary infection of the bladder grafted on to a gonococcal urethritis, or there is present a haematogenous pyelo-cystitis due to the colon bacillus or other pyogenic bacteria.[1] *Only one case of proved gonococcal cystitis was met with in 650 cases.*

Evidence of considerable clinical value can be gained by the use of the two-glass test. Though this test demands the consumption of additional time in examining each case and is therefore often omitted, yet its results are so helpful that I strongly advise its use in every case, especially at the first three sittings. It serves as a clinical control of the laboratory method of examination of the urethral film.

Cases of chronic pyelo-cystitis, if the cervix is obviously healthy, should at once be referred to the cystoscopist for suitable treatment. They should not be kept for one moment longer in the venereal section of the urological department than is necessary for diagnosis. Cystoscopy should never be performed in the venereal section. Careless workers would be bound to infect non-infected women with the gonococcus were this allowed. The cystoscopy section should be kept entirely distinct, and women only admitted to it if suspected of gonorrhoea after they have passed the full tests in the venereal section.

Examination of the Vagina and Cervix

At first we used the ordinary English patterns of specula, such as those of Fergusson (see Fig. 3) and Sims. We found that considerable time was wasted and results were not good when using Fergusson's speculum, as the cervix was too far

[1] See *Common Infections of the Kidneys*, Frank Kidd. Oxford Medical Publications, 1920.

away and lay at the bottom of a long hole insufficiently illuminated. The vulcanite pattern also could not be sterilized by heat—an insuperable objection for modern work. The Sims speculum requires an assistant if one hand is to be left free for taking smears. It gives a better view of the cervix than a Fergusson, but we have dispensed with it, except in the case of very large stout multiparae with severe prolapse. In such cases it is indispensable, and an assistant is required. We think we have found the ideal speculum for this work in Cusco's bi-valve speculum, or Brewer's modification thereof (see Fig. 3). This speculum should be kept in several sizes, and with blades of varying length and breadth to suit different lengths and widths of vaginae. We have also had a very useful dwarf model made for use in children, when it is considered necessary to inspect the cervix.

Cusco's speculum should be passed with the blades closed and presented parallel to the labia—that is to say, the edges point up and down, or north and south, and the sides of the blades point sideways, or east and west. In this position it can be insinuated gently to its full depth, whereupon it is rotated from left to right through a complete right angle. The blades are then pushed gently backwards and downwards and finally widely separated, and as soon as the cervix slides into view the blades are fixed by a turn of the screw.

After a little practice the cervix can be thus exposed in a few seconds in nearly every case, and the speculum holds itself in place naturally, with very little discomfort to the patient, and no trouble to the operator, who can make his observations and carry out his manipulations with extraordinary ease and comfort. With this method there is no need to pull on the cervix with a volsellum—a great gain.

Before passing the speculum it is advisable to lubricate it. A useful formula is as follows:

Glycerine	20 parts.
Tragacanth	2 parts.
Oxycyanide of mercury . .	$\frac{1}{4}$ part.
Distilled water	100 parts.

This lubricant should be dispensed in metal squeezer tubes.

Having exposed the cervix, dry thoroughly not only its

surface but the interior of the canal with pledgets of sterile cotton wool held on a pair of sponge forceps or fixed on a Playfair's probe. This is a very important step, and can be compared to the need for drying a diseased tongue before examining it. Now inspect the cervix and note the presence or absence of redness, swelling, oedema, 'erosion', laceration, ulceration, warts, or cysts; determine also the character and colour of the discharge issuing from the cervical canal, whether mucus, pus, or blood. As early as the sixth week of pregnancy the cervix presents a characteristic bluish appearance, and is soft to the touch, diagnostic points soon appreciated by the trained observer.

Again, he soon learns to recognize the common cases of chronic vaginitis with profuse vaginal discharge, when the vaginal portion of the cervix appears smooth and pale yet covered with a punctate erythema, where no pus can be seen issuing from the cervical canal, which is in reality healthy. He is able to rule out gonorrhoea at once in such cases on clinical grounds alone. Again, he learns to distinguish at a glance those cases, seldom if ever gonorrhoeal, which present dermatitis of the vulva and thighs, a thin acrid vaginal discharge due to dirt, and impetigo.

The stimulus of the presence of the speculum is usually sufficient to cause abundant cervical secretion. If not, the cervix can be stimulated to secrete by gently squeezing its lips between the blades of the speculum or with the blades of a sponge forceps. Having dried the cervix and the cervical canal thoroughly, introduce the sterilized platinum loop into the cervical canal and obtain at least two smears of its secretion on glass slides for laboratory examination. In carrying out marriage tests or tests of cure, cultures should be made from the secretion of the cervical canal in addition to the films, but they need not usually be made early in the case, or at the first few examinations, unless the films prove negative on more than one occasion.

Now gently withdraw the speculum with its blades partially released. In this way the whole mucous membrane of the vagina can be rapidly inspected. Note the presence or absence of swelling, oedema, redness, granular vaginitis, ulceration, and warts. The vagina seldom harbours the gonococcus for long.

That is because it is lined by stratified epithelium and possesses few crypts, so that antiseptics can act rapidly and effectively. To take smears of the vaginal secretion is a waste of time, as little, if anything, can be learnt therefrom, except not to do it again.

Finally, after the withdrawal of the speculum, make a careful bimanual examination of the pelvic organs with the gloved index finger of the right hand in the vagina, the left hand being placed between the legs on the abdomen. This position renders bimanual examination far easier than in the Sims position, as the abdominal muscles are relaxed and the fat of the abdominal wall does not sag and make weight on to the hand. All the pelvic organs can be felt with ease and gone over systematically. Is there any swelling or tenderness in the fornices, or of either ovary or tube, or of the uterus; are there any parametric or perimetric swellings; are there any tumours present? Note the mobility and position of the uterus.

Inflammation of the tube or ovary has been distinctly uncommon in our clinic. It was only met with in eleven out of 223 gonococcal cases (5 per cent.). This is in strong contrast to the usually accepted teaching of gynaecologists. This is because they do not see gonorrhoea in its early stages. They deal chiefly with the untreated cases that have been allowed to become pregnant with an existing gonorrhoea. If the cases are seen early and cured early, as they are in our clinic, inflammation of the ovaries is not likely to occur. Even the cases that come up infected and pregnant we cure before pregnancy is completed, and so save the ovaries. Gonorrhoea as a cause of sterility and one-child marriages should therefore become a thing of the past when early and effective treatment becomes universally understood and practised.

Again, if a menstrual period supervenes in a woman recently infected and the victim of the early acute stages of gonorrhoea, ascent to the ovary may occur if she remains up and about and doing heavy house-work. Rest in bed under such circumstances is advisable if the ovaries and tubes are to be protected.

The Question of Infection

The method of examination described above is carried out at the first visit when a woman applies to the hospital

complaining of vaginal discharge and painful micturition, or of obscure joint trouble. Very often at the first examination gonococci are found in some or all of the secretions examined. If they are not found, she is asked to come up again in a few days and a further examination is made. If this again proves negative, she is asked to come up immediately after her next period has finished. If this again proves negative, she is presumed to be free of the gonococcus, though in the course of the examination some other lesion or disease has usually been discovered, for which she is drafted to the appropriate department. If, despite these three negative examinations, clinical evidence and experience strongly suggest gonorrhoea, several further cultural examinations are made before she is passed as free from infection.

The Question of Cure

The same kind of examination is carried out when a patient has received treatment for gonorrhoea and when it is considered that she is probably cured as judged by clinical appearances. In that case, in addition to film preparations, cultural examinations are made of all the secretions obtained. If three such examinations prove negative she is passed as probably cured. Finally, she should be asked to report again in three months' time after she has returned to marital relations (if a wife), so that the effect on her husband may be noted. Thirteen per cent. of our cases attended till they had passed three film tests. Fifty per cent. of our cases attended until they were proved as cured by cultural methods. Thirty-seven per cent. of our cases failed to attend regularly until they were passed as cures by either method. These results can be considered as highly satisfactory when it is known that less than 50 per cent. of all out-patients ever attend the hospital regularly.

At the present day I do not think it is possible to demand more exact tests of cure than this, and in practice it appears to work satisfactorily. In private practice we have had the opportunity of following up the results of these treatments and examinations to an even fuller extent, and we have had no disappointments.

We have seldom employed the complement-fixation test as an indication of cure. In the first place, it gives highly differing

results with different observers. In the second place, if positive, it remains positive long after the case is cured. In the third place, it may become negative in many cases long before the cases are really cured if the gonococci are devitalized, and are lying near the surface and not being absorbed into the circulation. In the fourth place, it is unreliable if vaccines have been exhibited.

In our opinion careful bacteriological tests by a skilled bacteriologist of secretions obtained by the clinicians acting in concert are far more likely to prove accurate than a mere laboratory test of doubtful accuracy applied to the blood alone. We have been lucky to have had the services of Dr. Western, who has attended the department in person once a week and has actually inoculated all his culture media himself direct from the patient in the cases selected for tests of cure. He has hardly ever failed to cultivate the gonococcus in cases where his films have shown the presence of the gonococcus. I think this is a sufficient testimony to his skill and competence.

A note of warning should be struck at this point. There is no more difficult organism to identify in films or to grow on culture media than the gonococcus. Unless a bacteriologist has had a long and efficient training he is very liable to label as a gonococcus a variety of other less harmful and often non-pathogenic bacteria. Innumerable mistakes are made in this way by men who have had an insufficient bacteriological training.

Comment

The key to success in venereal work is painstaking and adequate examination of each successive portion of the uro-genital tract. There are no short cuts; the whole road must be travelled in each particular case. That is why the task is so exhausting and why so many trained assistants are needed, if a venereal clinic is to fulfil its proper function. No doctor should be expected to examine more than twenty cases at a sitting, and no sitting should exceed an extreme limit of two and a half hours. Otherwise, fatigue sets in and observation becomes perfunctory and fallacious. One ruling desire of a voluntarily supported hospital is to advertise the large number of patients treated within its walls, so as to attract subscriptions. This results in overwork for the doctors. It is to be hoped that

the Ministry of Health will set its face against perfunctory work, and will either set a limit to the number of patients to be seen by any one doctor at a session, or, if it is met with an increase in numbers, that it will respond with an increase of assistants.

The curse of gynaecology in England has been the tradition of the lateral or Sims position for the examination of patients. The position was felt to be so modest, and in Victorian England modesty had always to come before accuracy. In Germany I learnt the value of the 'lithotomy' position for cystoscopy, and realized that it was the best position for adequate ocular examination of the female uro-genital tract. When starting my venereal clinic at the London Hospital in 1917, I laid it down as axiomatic that all patients should be placed on their backs on cystoscopic chairs with their legs widely separated and raised on rests (see Fig. 2), that the examining doctor should wear a powerful head-lamp on his forehead, and that rubber gloves should be worn both by doctors and nurses. (This last precaution was adopted, as, previously, many cases of digital chancre had occurred in doctors attending out-patients. I am glad to say that owing to the use of rubber gloves no case of digital chancre has occurred in our clinic in six years.) I attribute the successful results of our treatment primarily to the laying down of these rules. Accuracy has triumphed, and I venture to think that modesty has not been outraged.

Students need constantly to be reminded of the fact that cases do not come up for examination conveniently labelled with a diagnosis. The female venereal clinic is in effect a sorting-house for women who come up to the receiving-room of the hospital complaining of vaginal discharge or of painful micturition. Such women may or may not harbour the gonococcus. But it is an excellent thing if they can be sent first to the venereal expert, who can separate the sheep from the goats, retain those infected with the gonococcus, and draft the others to their appropriate departments. The venereal specialist must have a good working knowledge not only of gonorrhoea but of syphilis, and of the other common diseases of the female genital and urinary tract. He should at once draft syphilitics for their first course of anti-syphilitic treatment, the gonococcus if also

present being left alone until that is finished, and the patient rendered more or less non-infective as regards syphilis during the course of the manipulations needed for the cure of gonorrhoea.

Many of the cases complaining of painful micturition are found to be cases of pyelo-cystitis (*Bacillus coli*, tubercle bacillus), and should be sent to the cystoscopist. Others are found to be suffering from uterine tumours, and these are referred to the operating gynaecologist. On the other hand, many of the cases are suffering from vaginitis and urethritis which are non-gonococcal, but in which the cause is simple, and the treatment very much the same as for specific infections. These are usually kept for treatment at the venereal clinic by mutual arrangement with the gynaecologist.

The Ministry of Health is at present too much concerned with manufacturing venereal specialists. A pure venereal specialist is bound to fail. The man who undertakes to carry out special treatment of venereal diseases should have had some training in gynaecology and genito-urinary surgery, and of course in general surgery and medicine. He should only deal with venereal diseases as a part of his work and for part of his time. He must never become wholly divorced from other branches of medicine.

Though great stress will be laid in these pages on the need for constant co-operation with the bacteriologist, yet it must never be forgotten that bacteriology is only one of the handmaids of medicine. A man starting to work on female gonorrhoea will co-ordinate what he actually sees with what is actually found by the bacteriologist working with him. Gradually he will find that his eye becomes trained to recognize all sorts of characteristic clinical appearances. In time he will be able by what he sees to forecast with extraordinary accuracy what the bacteriologist will find. In other words, he will build up a good clinical knowledge of the disease, clinical in its true sense because controlled by laboratory methods. Even so, he will never reach the stage at which he can afford to dispense altogether with laboratory aid. Nevertheless, he becomes a different man from the man who started with a blank mind, and his clinical opinion becomes of considerable value. In dealing with a woman who has held her water for four hours

before the examination he will make an error of less than 1 per cent. in forecasting what the laboratory will find. In other words, the learner must not forget to train his clinical eye because the laboratory is at hand. Clinical experience still holds the field as the most valuable and hardly attained of all kinds of medical experience.

CHAPTER II

GENERAL TREATMENT

Warnings and Instructions given to Patients undergoing Treatment

A copy of these instructions is printed on a small card and given to each patient so that there can be no misunderstandings:

1. Please understand that until the doctor passes you as cured you are infectious to a man. This is the fact even though you yourself see no sign of discharge, and may think you are all right. You will think you are cured long before you are really free from infectious germs.

2. During the early painful stages of the disease you will hasten recovery if you can rest in bed. *If a period comes on at that time, go to bed until it is over.* If rest in bed is impossible, do not worry, as it is not essential to the cure, though it quickens the process.[1] Later on, when the trouble is subsiding, daily exercise in the open air is helpful.

3. You must refrain entirely from all alcoholic liquor, which includes wines, spirits, beer, stout, ginger-beer, cider, and patent medicines. You should drink plenty of fluid—water, tea, coffee, cocoa, lime juice, orange juice, lemon juice, barley water, or natural mineral waters.

4. *Diet.*—There is no need to starve yourself on a milky or sloppy diet, as is so often recommended. When half-starved you cannot resist germs. Eat plenty of simple, solid food, such as you have an appetite for, and this should include a certain amount of butcher's meat. Your appetite is the best guide. Avoid articles of diet that burn the tongue, such as curry, horse-radish, mustard, pickles, spices, ginger, and also strong meat extracts and beef-teas.

5. If you can arrange it, you should sit in a hot bath before going to bed at night, so as to foment and wash the parts. Two teaspoonfuls of lysol, listerine, or milton should be added to an ordinary hip-bath. If you are using a common bath, try

[1] If a patient is in bed she does not constantly auto-inoculate herself with bacterial poisons, and so avoids 'negative phases'. Bed is particularly indicated *to save the tubes* if a menstrual period supervenes during the early acute stages of the disease.

and use it after every one else has finished. Always pass water before entering the bath. Wash your face before entering the bath—that is to say, do not bathe your face with the bath water after you have sat in the bath. Rinse out the bath with fresh water after use.

6. If you are not very careful you may convey the discharge to your own or to your children's eyes, and set up ophthalmia, and even loss of sight. For this reason, always wash your hands carefully after douching or handling the parts. Add a teaspoonful of lysol, listerine, or milton to the hand-basin of water before doing so. Always wash and dry the face before getting into a bath. Use a separate towel for the face. Have a special mark on the body towels and sponge, and put them where no one else can use them. Be especially careful that your own towels or sponges are not used by the children or by any other person. Wear a sanitary towel while the discharge is profuse. Be careful not to soil the seat when using the water-closet, as in this way you may convey the disease to your children. Do not use a chamber which your children are in the habit of using.[1]

7. You must refrain entirely from any kind of sexual excitement until the doctor passes you as cured.

8. You should not ride a horse or a bicycle until you are cured.

9. Above all, do not worry. If you let the disease get on your mind it will depress your general health and make the disease more difficult to cure. Remember you are not the first woman to get the disease, yet the world goes on all right. The disease is always curable, but the cure often takes several months.

Drugs

There are no drugs which can in themselves cure the disease —that is to say, rid the body of the infecting germs. Nevertheless, drugs are sometimes useful in relieving painful symptoms. If micturition is painful and frequent, relief can usually be obtained by prescribing sandal-wood oil in doses of 5 to 10 minims three or four times a day. This can be given in capsule form, or it can be administered in conjunction with alkalis, such as potassium citrate 30 grains, potassium bicarbonate

[1] We have found that amongst poor families if the father or mother contracts gonorrhoea several of the female children may develop it. We ascribe this to the use of a common towel and sponge, or a common water-closet, or a common bed.

15 grains, made up with chloroform water and a little mucilage. It is important to secure a regular daily action of the bowels. *On no account whatever should enemata be administered, as their use entails a risk of infecting the rectum.*

Vaccines and Sera

Vaccines and sera are not needed for the cure of gonorrhoea in the female. They have not been used in our clinic, as we did not wish to confuse the issue, yet we have obtained uniformly successful results without them.

LOCAL TREATMENT

Local treatment is of two kinds. First, local treatment of a special nature that has to be carried out by a trained doctor, which is described in later chapters. Secondly, that which will be described in this chapter, namely, local treatment that can be carried out by a trained nurse, or, if such is not available, by the patient herself.

Introduction

Basing our studies on what we had already learnt of the value of routine urethral irrigation in the male, we realized that we must, in some way or another, ensure a daily irrigation of the urethra. Having found in the male that there is no drug so effective as potassium permanganate, if properly applied in *suitable strengths*, we determined to employ this, and so far have seen no reason to alter our plan. Those who condemn urethal irrigation with permanganate in male or female are those who have not troubled to train themselves in its proper management.

At first we thought that it would be impossible to arrange for patients to attend daily for urethral irrigation, so we designed a urethral nozzle and gave out printed directions, using which the patients were able to irrigate their own urethras and bladders daily for themselves. We found that the patients soon learned to carry out these manipulations and with favourable results. Urethral irrigation can, therefore, if necessary, be carried out by the patient herself when she cannot attend more than once or twice a week.

As time went on, we found that the nurses who volunteered

to act in our department were anxious to carry out daily urethral irrigation. We were therefore able to arrange for patients to attend daily and receive irrigation from the nurses, so that for the last few years this has been customary for the majority of the patients. It also saved us a good deal of trouble in providing patients with douche-cans and nozzles; and the results were naturally better and quicker when the irrigations were carried out by trained nurses.

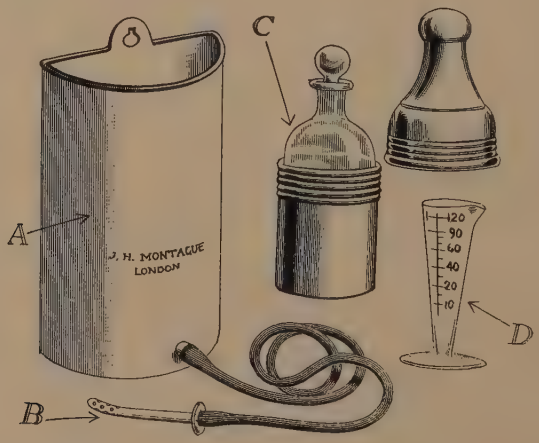

Fig. 4.—Irrigation apparatus and urethral nozzle.

Directions for Urethral Irrigation

Two pints of warm potassium permanganate solution are prepared in an irrigating tin, to which is attached some feet of rubber tubing, and a nozzle of *specially toughened* glass (see Fig. 4). This nozzle is closed at the end, but has a number of small lateral outlets. It is similar to a vaginal nozzle except that it is slightly curved, and is of such a diameter as to be able to penetrate the average urethra (20 Charrière). For routine purposes a strength of 1/2000 potassium permanganate is found to yield good results. In very acute cases with severe burning micturition, 1/4000 or even 1/5000 should be employed at the outset till the higher concentration can be borne with comfort. Refractory cases may need 1/1000 before the urethritis yields. The ideal temperature is 105° Fahr., but in the ordinary way the solution should be warm enough to be easily borne by

the skin of the finger, and can be made up with tap-water. In towns, at any rate, sterilized water is not necessary in making up antiseptic solutions, as the ordinary tap-water is usually free from pathogenic bacteria, and if any are present they are killed by the antiseptic.

Before irrigation the patient should pass water. The irrigator is placed at a height of 2 or 3 feet, not more. The wash is controlled with finger and thumb pressing on the rubber tubing. A little is allowed to flow, and then the nozzle is gently inserted into the urethra as the fluid flows. In that way it finds its way easily into the urethra. The urethra is given a good flush to clear it of pus and then the nozzle is pushed on farther, and a little less than half a pint of fluid allowed to run into the bladder and left there, the nozzle being withdrawn completely. The rest of the fluid is then used to douche the vagina, the same nozzle being used, or a glass vaginal nozzle being substituted. The patient then passes out the lotion in the bladder by a natural act of micturition. The lotion should not be left in the bladder more than a few minutes.

We find urethral irrigation to be a safe and effective practice, and shall continue to advise its use. This is proved by our results. For instance, we treated by this method 165 cases of gonococcal urethritis out of our first 223 cases and did not have a single complication. In all cases the acute urethritis rapidly yielded. In 650 cases we have only encountered one case of gonococcal cystitis. This was present before the patient applied for treatment, and promptly yielded to irrigation. Urethral irrigation does not therefore lead to cystitis, and soon ameliorates acute urethritis.

If the patient cannot attend regularly she should be given one or two practical lessons and should then provide herself with her own douche-tin, nozzle, permanganate solution, and printed instructions, and should learn to irrigate with the aid of a mirror. She is given a bottle containing potassium permanganate 1 part in 25, and is told to use so many drachms of this to each pint of water, to give a strength which is considered suitable to her case. After a little practice she can dispense with the mirror, and can find her urethra easily by touch.

A suitable outfit with printed directions is supplied by J. H.

Montague, 69 New Bond Street, London, W.1. It consists of the following articles:

1. An irrigator holding 2 pints (40 ounces), with rubber tubing attached (A).
2. A glass urethral nozzle and shield (B).
3. A 6-ounce bottle in metal case containing a solution of potassium permanganate in water (strength 1 part in 25) (C).
4. A 2-drachm measure (D).
5. A glass vaginal nozzle.

Directions for Use

Place the irrigator (A) on a nail or shelf 3 feet above the level of the abdomen. Attach the glass nozzle (B) to the rubber tubing of the irrigator and place the nozzle in the tin (in this way no clip is required).

Fill the irrigator with 2 pints of warm tap-water. Measure out [1] . . . drachms of the permanganate solution and add it to the water. Before irrigating, the patient should pass water so as to empty the bladder.

The patient can sit on a bidet or in a bath, or lie on a couch with a bedpan underneath her, or sit on a piece of mackintosh placed on a chair, the end of which hangs into a pail.

She now grasps the rubber tubing just above the nozzle with the finger and thumb, so as to prevent the fluid escaping.

Using a mirror, she places the nozzle just inside the urethra, and, relaxing the finger and thumb, allows the wash to flush out the urethra. After flushing out the first part of the urethra she gradually pushes the nozzle into the bladder, letting the fluid run all the time. When the nozzle has reached the bladder she should allow about a quarter of a pint of the lotion to flow into the bladder, and should then nip the rubber tubing with her finger and thumb and withdraw the nozzle completely. She should now use the rest of the lotion as a douche for the vagina, either with the urethral nozzle or substituting a glass vaginal nozzle. She then rises and passes water naturally. By this act she empties the bladder of the lotion it contains and flushes out the urethra with that lotion.

[1] This space is left blank, and is filled in for each case with a suitable figure.

If prostitutes could thus learn to irrigate their own urethras with 1/2000 potassium permanganate the morning after contact there would be far fewer infected urethras. (See Chapter XII, 'Prophylaxis'.)

In prescribing permanganate for the patient's own use, it is wise to order it in rather weaker strengths than would be employed in that particular case if she were attending for irrigation by a skilled attendant.

The vulva should be washed daily with soap and water, dried, powdered, and covered with a sanitary towel. Twice a week, when the patient withdraws her flavine tampon (see p. 75), she should give herself a vaginal douche with a glass vaginal nozzle, using 2 teaspoonfuls of common salt to 2 pints of boiled water.

So far we have dealt with the ordinary routine methods of treatment that can be carried out by a nurse or by the patient herself. How long must daily treatment of this nature be carried out? Usually at the end of ten to fourteen days all acute symptoms and signs have subsided in the urethra, so that daily treatment can be suspended. At this stage if the glass test (p. 52) shows threads only in the urine, or merely a trace of pus, the urethra is treated twice a week with dilatations and paintings with silver nitrate, and between these treatments she is given one urethral irrigation. In the average case another month's treatment along these lines will suffice to cure the urethritis altogether.

In addition to this daily routine the patient must attend regularly, preferably twice, but anyhow once a week, for special local treatment to be applied to the latent foci on the part of a trained doctor.

In private practice it is often possible to carry out these special treatments more often, even once a day in favourable cases, with greatly increased rapidity of cure.

CHAPTER III

SPECIAL DIAGNOSIS AND TREATMENT OF VULVITIS, VAGINITIS, AND BARTHOLINITIS

Special Forms of Diagnosis and Treatment to be employed by the Physician himself

In practice the female uro-genital tract falls into certain natural divisions for purposes of diagnosis and treatment, namely, the vulva, the glands of Bartholin and the vagina, the urethra and bladder, the cervix, the endometrium, Fallopian tubes, and ovaries. The physician has to examine these in order, track the gonococcus to its lairs, and destroy it in detail wherever it is found.

VULVITIS, VAGINITIS, BARTHOLINITIS

Section I.—VULVITIS

Acute Vulvitis

The commonest causes met with in our clinic were gonococcal infection, uncleanliness, irritant douches, and infection of the hair follicles of the labia majora.

Symptoms.—The patient complains of a feeling of heat and swelling in the vulva, accompanied by considerable pain and discomfort; of a profuse purulent discharge, and usually of scalding micturition.

Signs.—Inspection and palpation of the parts reveals swollen, red, tender labia glued together by profuse purulent discharge.

Diagnosis.—It is a useless procedure in adults to take smears or cultures of vulval or vaginal discharges. The presence of the gonococcus, if causing the vulvitis, will be demonstrated in the urethral or cervical smears.

In cases due to uncleanliness the gonococcus cannot be found in the urethra or cervix, the discharge is of a most unpleasant and characteristic odour, warts ('condylomata acuminata') are often seen, and there is usually a moist, macerated condition of the skin around the vulva which extends on to the inner surface of the thighs, and may set up a dermatitis of these

parts.[1] The area of dermatitis has a sharply defined margin which suggests that the cause is a vegetable parasite. We have an impression that the dermatitis may be the primary focus, and that the disease spreads secondarily to the vagina. The vaginal discharge is sometimes of a yeasty character. Strong sulphur ointment appears to control the dermatitis.

In vulvitis due to the irritation of douches that are too hot or too strong, the history and the excessive swelling of the labia, often covered by thinly excoriated areas, will suggest the diagnosis.

In follicular vulvitis the inflamed, purulent, and tender hair follicles lying on the hairy parts of the labia and infected with staphylococci are at once apparent, and suggest the primary cause. Injections of colloidal manganese will often heal these in a remarkable manner.

One labium may be swollen and oedematous as the result of a primary syphilitic sore. There is, however, little redness or tenderness, but there is a curious look of non-inflammatory and non-irritated oedema and swelling which is readily recognized. Careful examination will reveal a raised hard-edged sore or chancre, scrapings from which should be searched for the *Spironema pallidum*; typical shotty, painless buboes will also be felt in one or both groins. If specific spirochaetes are present, and if the blood reaction is negative for syphilis, intensive intravenous treatment should be instituted at once, as it will, in nearly every case, prevent the onset of secondary syphilis, and will lead to a rapid cure in a few weeks. Practical experience

[1] It is a curious thing that not only amongst the lower classes, but also among the educated classes, there is often a failure to wash the external genitals in an adequate manner. Most girls are told, if they are told anything at all by their mothers and teachers, that it is not safe to wash the parts whilst they are menstruating, and that they must not take a bath during that time. Many of them, therefore, acquire an unnatural fear of washing the parts even when not menstruating. During a bath a woman ought to soap the external genitals and inner sides of the thighs and nates, so that the water in the bath may cleanse the vulva as it dissolves and washes away the soap. Till the first rush of blood is over it is often difficult, if not impossible, for menstruating women to take a bath. But as soon as that is over, the woman should wash the parts with soap, sponge, towel, and hand-basin, and should then enter a bath. Better still would it be if Englishwomen were provided with 'bidets', as is common in France. It is very difficult for a woman to keep really clean unless she has a bidet. Provided with this she can wash the parts every time she passes water when menstruating, and in this way will gain immensely increased comfort at that trying time. She can also wash at the bidet before entering her bath.

proves this. If, on the other hand, the blood reaction is positive, and well-marked secondary rashes are present, as well as sores in the mouth and throat, and generalized enlargement of the glands (especially the epitrochlears), the diagnosis is easy, but treatment must be of long duration (two to three years).

Chronic Vulvitis

This may follow an acute vulvitis, or may come on insidiously without any sharp symptoms. The commonest causes among our cases were gonococcal infection, uncleanliness, irritation of chronic vaginal discharges, infections of abrasions of the vulva caused by scratching, the scratching being the result of irritating vaginal discharges, eczema, herpes, pediculi, scabies, and the congestive pruritus of pregnancy.

Symptoms.—The patient complains of vaginal itching or soreness, and of slight increase of vaginal secretion, which may amount to a definite thin cloudy discharge which stains the linen or sanitary towel.

Signs.—The vulva is not appreciably swollen, but the mucous membrane is rough, and covered with a tenuous muco-purulent discharge. Abrasions, erosions, and even warts are frequently encountered on the inner surface of the labia, and there is usually a well-defined dermatitis of the skin of the perineum and inner surface of the thighs. These erosions are comparable to the erosive balanitis met with in the male, and said to be due to Vincent's spirillum.

Diagnosis.—In the case of gonococcal infection, gonococci will not readily be found in the vulval discharge of adults, and it is a waste of time to look for them. Gonococci must be searched for in the secretions of the urethra and cervix, and if found, the cause of the vulvitis has been determined.

In the absence of gonococci in these secretions, a diagnosis can usually be made by searching for the various other causes above mentioned, such as uncleanliness, pruritus, eczema, herpes, and parasites. Removal of these causes initiates the cure. Some of the cases with erosions suggest primary syphilis, which can be excluded by the absence of hard, painless buboes, general adenitis, the *Spironema pallidum*, and a positive Wassermann reaction.

Treatment of Acute and Chronic Vulvitis.—In hyper-

acute cases the patient should be confined to bed, and should have hot sitz-baths twice daily. Half an ounce of lysol, listerine, or milton should be added to the bath. Between whiles, lint soaked in lotio plumbi or in linimentum calaminae should be applied to the vulva.

Linimentum Calaminae

℞	Calaminae	gr. xx
	Zinc. oxidi	gr. xv
	Aq. calcis	℥ iv
	Ol. olivae	ad ℥ i

In acute and chronic gonococcal cases of adults, special treatment must be directed to the primary foci in the urethra, glands of Bartholin, and cervix. When it is possible this treatment should be carried out daily, but at the clinic we have been accustomed to carry it out twice a week with good results, the urethra and vagina, however, being irrigated daily by a nurse.

The cervix is exposed by means of a Cusco's speculum, and, after being swabbed dry with wool, is painted with 2 per cent. flavine applied with wool twisted on to a Playfair's probe. As the speculum is withdrawn, the walls of the vagina are painted with 2 per cent. flavine on wool held by a pair of sponge forceps, and finally a tampon soaked in 2 per cent. flavine is left in place for twelve hours.

The urethra is irrigated daily with potassium permanganate, starting with 1/4000 in acute cases, and working up to 1/2000 or even 1/1000.

The vagina is also irrigated daily and after removal of the tampon with the same solution, or with physiological salt solution. If the flavine causes irritation, we change for a few days to eucalyptus oil, dissolved in olive oil, in a strength of 10 per cent.; but usually we find that flavine produces neither pain nor any toxic effect, and under its use the acute signs of inflammation disappear as if by magic.

We employ the same treatment for chronic gonococcal vulvitis.

Additional Notes on Pudendal Sores

CONDYLOMATA ACUMINATA, OR SO-CALLED VENEREAL WARTS

These may appear on the skin of the perineum or mons veneris, on the labia, or even in the mouth of the vagina. They are more often met with in non-gonococcal cases, associated with uncleanliness, most markedly in pregnant women, and are seldom encountered in children. They vary in size from the tiniest little warts to warty tumours the size of a man's fist, the latter appearing as discrete pedunculated excrescences or as large coalescent cauliflower-like growths with broad sessile bases, in colour white or pink, their surface sometimes firm and dry, at other times moist and macerated by offensive discharge.

Under the microscope, warts are seen to consist of an overgrowth of the stratified squamous epithelium and its underlying papillae, and to possess a distinctly pointed apex, in contradistinction to the condyloma planum of secondary syphilis, which is a flattened papule formed by an overgrowth of the deepest layers of the skin, accompanied by a round-celled infiltration near the blood-vessels, and in which the superficial epithelium is thinned out or even worn away altogether.

Treatment.—In mild cases the warts may disappear if they are kept dry by means of a simple dusting powder such as—

Salicylic acid in powder	3 parts
French chalk	87 „
Lycopodium	10 „

and if, at the same time, the vaginal discharge can be checked by appropriate treatment. If this treatment fails, small pedunculated growths can be snipped off under novocain or the ethyl-chloride spray, and their cases touched with pure carbolic or the actual cautery.

Sessile warts can be dissected off and the wound closed by sutures; but better results can be obtained by the application of diathermy. The warts are covered for ten minutes with a pad of lint soaked in 5 per cent. novocain solution, or, better still, a sterilized solution of ½ per cent. novocain is injected beneath their bases. A suitable diathermy needle or electrode is then applied to the various warts in turn, the current being gradually increased till the warts turn white. Before actual charring or sparking can occur, the current should be turned off. Within a short time the warts drop off and are replaced by supple epithelium. A suitable machine for this purpose is one designed for us by the Genito-Urinary Manufacturing Company, of 64 Great Portland Street, London, W. It is portable, and can be attached to a constant current of 110 to 250 volts.

SOFT SORES

These are met with on the inner suface of the vulva. They may be single or multiple, and are non-indurated, sharply punched out, ovoid, circular, or serpiginous ulcers, with a yellow or pink floor which is sometimes elevated above the surface of the surrounding skin. The edge is usually marked by a red areola. They are usually accompanied by enlarged glands in both groins, which become oedematous and reddened, and tend to break down and give rise to serpiginous ulcers in the groin.

Soft sores are often exceedingly resistant to treatment. The treatment is based on the hypothesis that they are produced by an anaerobic bacterium, and consists in exposing them to nascent oxygen and iodine. Nevertheless, though their superficial portions may clean up quickly, yet their deeper portions may remain infective and keep spreading, or refuse to heal up. For this reason the deeper portions may

need to be destroyed by caustic or cauterizing agents before a cure can be obtained. Start by an application of hydrogen peroxide (10 volumes), dry off the bubbles, and apply iodoform powder. If this fails, apply zinc peroxide or ectogan powder, and give iodides by the mouth, or apply a lotion of zinc sulphate, 5 grains; copper sulphate, 2 grains; water, up to 1 ounce.

The following treatment for male patients is recommended as unfailing by Rosenwald, *Urologic and Cutaneous Review*, Sept. 1923:

To obtain the best results the compounding must be done by following the instructions carefully. The fluid drugs are measured by volume and not by weight.

Formula

Calomel	1 oz.
Zinc sulph.	2 „
Tinct. camph. co.	2 „
Lime water	8 „

The mixture is made in a glass-stoppered bottle by mixing the calomel and lime water. This is throughly shaken several times a day for a period of two days, then the sulphate of zinc and camphorated opium added. The mixture is now ready for use.

A thin film of cotton about 1 inch by 3 inches is laid on the palm of the hand. The mouth of the bottle is now placed on the cotton, and a few shaking movements saturate the cotton, leaving a slight deposit. The entire length of the film is treated in this manner. The 'buttered' side of the cotton is now placed around the penis, covering the ulcerations, and the foreskin drawn over the cotton. The pain produced by this application is variable, but not intense enough to require any anodynes. The patient is instructed not to remove the cotton but to return the next day for further treatment. The cotton is now removed, and every chancroid is plainly outlined and limited. Chancroids from the size of a pin-point to the extent of a silver dollar are shown plainly. The uninfected skin has not been damaged in the least. What moisture is present is wiped off with a little cotton, and some of the following ointment applied:

Formula by Weight

Zinc oxide	1 oz.
Starch	1 „
Boric acid	1 „
Gum camphor	1 „
3 per cent. carbolated vaseline	12 „

After the second day the chancroids begin to drop out, leaving a clean, granulating surface which heals with remarkable rapidity. The ointment is applied daily till healing is completed.

If these measures fail, administer a general anaesthetic, and cauterize the ulcer completely either with the actual cautery or a diathermy electrode, or by means of the acid nitrate of mercury, and apply orthoform powder to the resulting sore.

There is a type of spreading soft sore in the inguinal region which may fail to react to any of these treatments. In such cases we have had success by giving intramuscular injections of intramine (2·5 to 5 c.c.).

HERPES

Small superficial multiple ulcers, the size of a pin's head, with a greyish base, are met with, and correspond to herpes praeputialis in the male. They are very tender to the touch, and are undoubtedly infectious and give rise to herpes in the

consort. They tend to recur again and again, and are very obstinate of cure. The ulcers may coalesce and give rise to superficial ulcers with polycyclic edges. The best treatment is to apply a touch of pure silver nitrate to their floors, and to cover them with a simple ointment, such as zinc ointment.

Other ulcers met with on the labia include primary, secondary, and tertiary syphilis, tuberculosis, epithelioma, phagedaena, and granuloma inguinale.

PHAGEDAENA

Gangrenous ulceration accompanied by severe constitutional symptoms is in rare instances met with on the vulva just as it is met with on the penis. It is said to be caused by symbiotic organisms, a vibrio and a spirochaete. The disease is contracted from sexual intercourse, and has an incubation period of a few days only. The disease starts as a small angry-looking oedematous ulcer covered with creamy yellow foul discharge, which spreads in a few days very deeply, and causes a black moist gangrene of the deeper tissues. The patient is profoundly ill and feverish. The profound general intoxication and the rapid onset of gangrene are the distinguishing features.

The parts are widely exposed and thoroughly cleansed with full-strength hydrogen peroxide. The patient then sits for fifteen minutes in a bath containing 1/3000 potassium permanganate, the labia being separated so as to expose the parts thoroughly to the oxidizing agent. The ulcer is then covered with gauze soaked in 1/3000 potassium permanganate, which is changed every half-hour. Every four hours the cleansing with hydrogen peroxide is repeated.

The fever quickly subsides, and in a few days a line of demarcation appears. When this is well defined the necrotic areas are removed. Under this treatment it is possible to save the life of patients so infected, without the need for a mutilating operation. (Cross and Zevalkink, *Urologic and Cutaneous Review*, Sept. 1923.)

ULCERATING PUDENDAL GRANULOMA, OR GRANULOMA INGUINALE

This is a rare form of extremely chronic slow-spreading ulceration of the pudenda, which was first described by MacLeod in India in 1882. It occurs throughout the world, but chiefly in tropical regions and in coloured races. We saw one instance of it in our clinic. It is at first usually mistaken for a syphilitic lesion, but the absence of enlarged inguinal glands and its failure to react to anti-syphilitic treatment soon contradict such a diagnosis. It is then suspected as tuberculous, but this origin can be ruled out by microscopic sections and bacteriological examination. Malignant disease is also ruled out by microscopic section.

As the causal agent some investigators suspect a spirochaete, others a protozoon, and others a bacillus.

Histologically the diseased tissues present nodules of degenerated round cells contained in a delicate reticulum of fibrous tissue. There is a complete absence of giant cells.

The disease gradually eats away the genital regions, but never spreads to the regional glands. It is only mildly contagious, and has a short incubation period.

The disease reacts to intravenous injections of tartar emetic, and under such treatment heals up in three or four months. (F. R. Carter, *Urologic and Cutaneous Review*, Sept. 1923.)

Section II.—VAGINITIS

The vagina is a long tube, formed of one of the toughest fibrous membranes in the body, designed to withstand the most vigorous assaults, rupture of the vagina being one of the rarest

of injuries. It is designed by nature to enfold an organ in theory 'surgically unclean' and covered with numerous germs, yet in practice no harm follows. In its natural state, the vagina is lubricated by a secretion formed mainly of squamous cells, strongly acid, and said to possess a natural bactericidal action.

The lining membrane of the vagina is not, strictly speaking, a mucous membrane, but is lined by a stratified squamous epithelium. It possesses no glands in the true sense, but in some cases it possesses a few small crypts lined by cylindrical epithelium tucked away amidst the squamous layers. In health its milky-white secretion is produced by a shedding of its squamous epithelium.

Lubrication of the vagina is obtained under stress by the addition of secretions from the cervix and the vulval glands of Bartholin. It is often forgotten that the normal vagina is a wet tube and not a dry tube. Nature has provided means whereby the vaginal passage is kept just sufficiently wet or damp so that its moisture shall not exude on to the linen. There is a perfectly adjusted normal balance between the formation of moisture and the drying up of the same. Under conditions of sexual excitement an almost instantaneous pouring out of secretion occurs from the glands of the vulva and cervix for purposes of lubrication.

In modern life this excess of secretion is continually being brought into play by the stimulation of erotic dancing and cuddling, which should in a state of nature end in an act leading to a natural deturgescence of all the glands and the return of the secretions to normal.

There can be little doubt that the leucorrhoea of young girls may be brought about by this unnatural stimulation of the parts without natural gratification, and only in a physiological and functional sense can such leucorrhoeas be termed pathological. Leucorrhoea at this age is also connected with anaemia, and with emotional stress, producing a condition of phosphaturia and excessive secretion of mucus. It is necessary to make these points plain, as the treatment of such leucorrhoeal discharges in young women should not be directed locally, but rather to the nervous system and to the general health. Nevertheless, it is a trying thing for a woman to be the subject of excessive vaginal secretion which necessitates the wearing of

sanitary towels, a source of irritation and discomfort, so that she may demand local treatment for such excesses of nature. If so, a mild astringent douche can be ordered, such as zinc chloride, 10 grains to the pint of water, or lead acetate, a drachm of the strong solution to the pint of water.

The normal vaginal secretion has the appearance of curdled milk, and is strongly acid in reaction, bactericidal as regards pathogenic bacteria, contains no mucus, and microscopically consists of squamous cells and an assortment of bacteria and yeasts which are not pathological. If examined by film methods there is seen a long, thick, Gram-positive, non-motile bacillus (the bacillus of Döderlein) which does not grow on artificial media, a bacillus which produces lactic acid, and often a yeast fungus.

A functional excess of vaginal secretion must be sharply distinguished from pathological vaginal discharge. Leucorrhoeal excesses of normal secretion (not discharges in the strict sense) may be due to pregnancy; sexual excess, and prolonged sexual excitement without gratification; anaemia, and unsatisfied sexual longings in young girls.

Pathological Vaginal Discharges

These are sometimes barely acid in reaction, or may be distinctly alkaline. They contain mucus and pus and occasionally bubbles of gas. Test them with a strip of litmus paper. Their microscopic examination may reveal a large variety of bacilli and cocci with or without pus cells, and such pathological bacteria as staphylococci, streptococci, gonococci, pneumococci, and the *Bacillus coli* (haemolytic and non-haemolytic).

Pathological discharges may arise from the vagina itself, but far more frequently they are secondary to discharges of pus from the cervix, uterus, and Fallopian tubes, the peritoneal cavity, the pelvic cellular tissues, the urethra, and even the rectum. Mucous discharges are uncommon, and are usually due to rupture of a vaginal or cervical cyst. Purulent discharges are common and are usually secondary in origin.

Blood-stained discharges are the result of injury or ulceration in the vagina or its neighbourhood.

Causes of Vaginitis.—The common causes encountered at the clinic were gonococcal infection; secondary syphilis; un-

cleanliness, associated with impetigo, folliculitis, eczema, and pediculi; sepsis, the result of pregnancy, miscarriage, and parturition; prolapse, fibroids, dilatation of the cervix; foreign bodies, such as unclean pessaries, and unskilled douching.

Symptoms.—The patient complains of a profuse vaginal discharge, of heat and spasm in the vagina, often accompanied by painful micturition and defaecation.

Signs.—The vaginal lining is tender to the touch of a speculum, and appears to be steaming with heat; its walls are red, swollen, and roughened, owing to the inflammatory swelling of the papillae. It is bathed in purulent secretion, and the inner surfaces of the labia and the skin of the thighs may become red and eczematous, from the irritation of the discharge and of the sanitary towel.

Differential Diagnosis.—Gonococcal vaginitis is always secondary to cervicitis or urethritis, so that the diagnosis is made by identifying the gonococcus in these regions. It is a waste of time to look for it in the vaginal discharge of adults.

In non-gonococcal cases the cervix may not show an erosion, but may exhibit a punctate erythematous appearance that can only be recognized by experience. In many of these cases the cervix and its secretion may appear quite healthy, especially in the primary vaginitis of pregnancy and of the menopause, yet the vaginal discharge is profuse and purulent.

In puerperal cases the history and the torn cervix will lead to a correct diagnosis. A history of persistent 'whites' commonly dates from a confinement. Either the confinement has not been an aseptic one, or there has been laceration of the cervix with imperfect healing, or there is imperfect involution of the uterus, possibly with retained portions of placenta.

Granular vaginitis is described below, and is met with in gonorrhoea in pregnant women.

In the common cases, due to irritant douches, the history and the excoriated and bullous appearance of the vulva and vagina will suggest the diagnosis.

Treatment.—In adults the treatment of acute gonococcal vaginitis must be directed to the primary foci in the cervix or urethra. If possible, the patient should be confined to bed, and should take a hot sitz-bath night and morning. Blankets are put over the shoulders, and the patient keeps adding very

hot water from a jug. Two drachms of lysol or listerine should be added to the bath. Immediately after the bath the patient returns to bed, which should have been warmed up with hot-water bottles so as to avoid chill.

If there is much pain and swelling, considerable relief can be obtained by the application of lead lotion or calamine liniment on lint to the vulva.

The cervical canal and vagina are swabbed out with 2 per cent. flavine and a tampon of the same left in place. The urethra is irrigated with potassium permanganate, and the vulva is swabbed with 2 per cent. flavine. This can be done daily, but usually it is only possible to carry it out twice or three times a week. If there is irritation after this treatment, one part of eucalyptus oil dissolved in ten parts of olive oil should be substituted for the flavine until the irritation dies down, when a return is made to the flavine. Experience proves that the vaginitis subsides quickly under this treatment. In the course of a week or ten days an acute vaginitis clears up entirely or becomes mild or 'chronic'.

Chronic Vaginitis

This may follow an acute attack, but is often chronic from the onset. The symptoms are excessive vaginal discharge, dyspareunia, and painful micturition. Examination reveals a thin, profuse, purulent vaginal discharge and an increased redness of the vaginal lining membrane. In a venereal clinic practitioners will become familiar with a form of vaginitis met with in gonococcal pregnant women, called 'granular vaginitis'. In this condition the discharge is green and tenacious, while the vagina exhibits red, raised, hard nodules scattered uniformly over its surface.

Treatment applied to the cervix and urethra gradually leads to the disappearance of a chronic gonococcal vaginitis. In simple chronic vaginitis, which in many cases is resistant to mild treatment, we have employed with success the application to the vagina of a tampon covered with an ointment made up of precipitated sulphur 1 part, soft paraffin 2 parts. This is applied every twenty-four hours until the appearance and secretions of the vagina return to the normal.

Section III.—INFLAMMATIONS AND CYSTS OF BARTHOLIN'S GLANDS AND THEIR DUCTS

Anatomical Features

Bartholin's glands lie on either side of the entrance of the vagina, buried in the erectile spongy tissue of the labia majora towards their posterior end. The duct of each gland opens on the inner side of each labium minus, just in front of the hymen, from which point it runs outwards and downwards for a distance of half an inch, and splits into several main branches, which in turn are distributed to the lobules of the racemose gland. The gland is the size of a broad bean, and lies very deeply placed beneath the spincter vaginae muscle and buried in the vascular erectile tissue of the bulb. That is why haemorrhage is freely encountered when operating on the gland; the bleeding may come from the vascular spaces of the bulb or from the artery of the bulb itself. The narrowest portion of the duct is the entrance itself, but even the entrance will admit a No. 1 lachrymal duct probe and a blunt hypodermic needle of 23 gauge. From the entrance it widens out considerably, and appears to run quite straight and without kinks to the gland itself. These points are of importance as regards treatment. The duct is lined at first by stratified epithelium, which, however, soon gives place to a transitional epithelium. The alveoli of the gland are lined by cylindrical cells, chiefly of the goblet type. The function of the gland is to pour out rapidly a lubricating fluid when occasion arises.

We have observed that it is not at all common to find that an infection of the vulva or vagina has spread to the duct and set up inflammation therein without extending as far as the substance of the gland. The duct appears as a red spot, and may become temporarily blocked with inflammatory products. In that case the gland itself may feel swollen, yet the swelling is simply caused by retained mucoid secretion.

Pathological Anatomy

In untreated cases the ductitis gradually resolves itself, but the duct may be left occluded in any portion of its length by inflammatory thickening of its wall rather than by blockage

with inspissated secretion. This leads to two varieties of cyst formation:

1. A ductal cyst, which is always a single cavity lined by squamous epithelium, and lies superficially well forwards and inwards in the vulva itself.

2. A glandular cyst, which may be unilocular or multilocular, and lined—partly at any rate—by glandular elements, and which pushes its way backwards deeply into the recto-vaginal septum. It is apparent, therefore, that great care must be exercised when dissecting out this variety of cyst, to avoid wounds of the rectum and to attend meticulously to complete haemostasis.

Bartholin's cysts may be unilateral or bilateral, and usually contain a clear serous fluid. They are primarily bacterial in origin, gonococcal and non-gonococcal, but by the time they are large enough to be detected all bacteria in them may have died out, so that their contents may be found sterile. They may suddenly become enlarged and painful from haemorrhage or suppuration.

Inflammation of Bartholin's Glands and their Ducts

It has been widely held that all inflammations of Bartholin's glands are due to the gonococcus, and that an enlargement of Bartholin's gland is evidence of impure connexion. This is a gross fallacy, and one that should be removed from the text-books. Such statements have obtained currency owing to inadequate bacteriological investigations. It is not uncommon for the glands of Bartholin to become enlarged and even inflamed a few days after the rupture of the hymen on the marriage night. This is associated either with over-stimulation, or with a mild vaginitis and vulvitis due to trauma. Do not then be in a hurry to accuse the newly wed husband simply because of a Bartholinitis. Any cause of vulvitis or vaginitis may lead to Bartholinitis. For instance, in one of our cases Bartholinitis was found to be due to the paratyphoid bacillus.

How often may we expect to find Bartholin's glands infected in a series of cases of true gonorrhoea? Various figures are given by different authors. For instance, Freyer gives 50 per cent., Olhausen 36 per cent., Menge 20 per cent. We feel that these figures give an exaggerated picture of the importance of Bartho-

linitis. In our clinic we found evidence of Bartholinitis in 30 out of 223 gonococcal cases, or 13 per cent., and in 26 out of 382 non-gonococcal cases, or 7 per cent. In the whole 605 cases there were 56 of diseased glands, or 11 per cent.

Infections may spread up either in the lumen, or in the walls of the duct, to the deep recesses of the gland, and may set up acute or chronic inflammation of the glandular tissue. Inflammation may be limited to the duct alone, which can be seen exuding a drop of pus, and surrounded by a bright red circle of inflammation, the 'macule of Sänger' (see Plate II *b*). Inflammation may spread up to the deeper tissues of the gland and give rise to a diffuse inflammatory swelling of the whole or a part of the gland. This may subside and complete resolution may occur, or it may leave behind a chronic inflammatory thickening of the gland.

Sometimes the inflammation is so acute that a portion of the gland is digested and an abscess is formed. Such an abscess seldom represents the whole gland, but is formed only in a portion of the gland. This is the reason why incision of an abscess of the gland does not always put an end to the infection of the remainder of the gland. Abscesses, therefore, tend to recur in other parts of the gland not previously the subject of abscess. In such relapsing cases it is better to excise the whole gland rather than continue to open abscesses as they arise.

It should not be forgotten that even when an abscess has been opened and has closed satisfactorily, nevertheless further treatment should be carried out to the remainder of the gland and its duct. (See below.)

Bartholinitis is usually associated with vulvitis, but it may occur by itself. It tends to persist long after the vulvitis has been alleviated, and needs special treatment to prevent relapses of the vulvitis.

Diagnosis.—Look for the orifice of the duct. This may appear as a mere red spot, not amounting to a macule, on the surface of the reddened mucous membrane. This disappears in a few days when the vagina is painted, and should not be taken as definite evidence of a ductitis. If the duct orifice is surrounded by a well-marked macule of Sänger, the ductitis is undoubtedly well established, as the macule persists for a long time even in chronic cases.

Squeeze the orifice of the duct and note if pus can be pressed out of it. If so, make a film and examine for gonococci and other bacteria. If pus can be expressed, and yet if no enlargement of the gland can be felt between the finger and thumb, a diagnosis of ductitis should be made. If, on the other hand, the gland is felt to be enlarged, insert a fine duct cannula and syringe out the duct with 2 per cent. flavine (see Fig. 5), after which squeeze the enlarged gland and note the character of the resultant secretion. In some cases this is found to be mucoid and sterile—mucoid retention cyst secondary to acute ductitis. In other cases, and especially in those where the gland is felt to be hot, painful, and tender, the secretion is purulent, whereupon a diagnosis of glandular infection is made. Gentle massage of the gland often leads to resolution of a subacute inflammation, especially if combined with lavage of the gland through the duct with 2 per cent. flavine. In severe cases there is great pain and tenderness in the vagina and labia, especially when walking, and there may be fever and malaise. The labium majus is red, hot, tender, and swollen, and pus tends to appear and point above and outside the duct opening on the labium majus, or may burrow and point on the perineum, or even burst into the rectum.

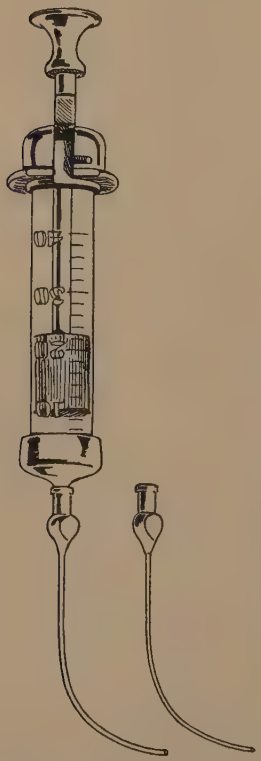

Fig. 5.—Cannula and syringe for treating Bartholin's duct and gland.

In some cases of abscess of Bartholin's gland there is a mixed infection. In addition to the gonococcus a streptococcus or a colon bacillus may be found. Ten cases of abscess of the gland due to the gonococcus were encountered in 223 cases, in one of them the gonococcus was found in the abscess, and could not be found anywhere else in the tract; six cases of abscess were met with in 382 non-gonococcal cases, one due to the paratyphoid bacillus. It is

not always easy to detect gonococci in a Bartholin's abscess. But if gonococci are present in urethra or cervix, there can be little doubt that the abscess is also gonococcal.

The differential diagnosis of an abscess of this gland is from an infected haematoma of the labium majus, a cellulitis of the same, and even an ischio-rectal abscess.

The differential diagnosis of a cyst from a chronic inflammatory swelling is usually simple. An inflammatory swelling is hard and nodular and feels solid; a cyst is smooth, rounded, absolutely painless, and gives the sense of elasticity or even fluctuation. Do not expect to be able to demonstrate translucency in a cyst, as it may be too deeply embedded in the solid erectile tissues.

The differential diagnosis of a cyst from other cystic swellings is to be made on general principles from hydrocele of the canal of Nuck, inguinal hernia, vaginal cyst, and from solid tumours of the labium, such as a fibroma.

Treatment. In the case of acute ductitis a fine No. 1 lachrymal probe can be introduced into the duct so as to dilate its orifice. Pus can then be squeezed out through the enlarged opening. Into the opening is introduced the nozzle of a lachrymal duct syringe, or blunted hypodermic needle (23 gauge) attached to a hypodermic syringe, with which a few drops of 2 per cent. flavine can be instilled into the duct and gland. Experience teaches us that this usually produces a speedy cure. This line of treatment can be combined with gentle massage of the gland carried on two or three times a week. Out of eleven cases so treated ten were followed to the end and were passed as cured. The eleventh had to go away to another part of the country before cure was complete.

Cases which resist this treatment might need excision of the gland, but so far we have had no need to carry this out in the clinic, as we have obtained uniformly satisfactory results on the lines of treatment above described.

When an acute adenitis, whether suppurative or non-suppurative, has subsided, massage of the gland should be carried out after the duct has been dilated with a probe, and this should be followed by an instillation of 2 per cent. flavine into the duct.

Abscess of Bartholin's Glands

In early cases of acute inflammation of the gland, if there is fever and the swelling is becoming daily more acute, a decision should be made as to whether an abscess is about to develop or not. If it is considered that an abscess is developing, it may be wise to anticipate this and dissect out the gland, whole and complete with its duct. Nevertheless, such a situation does not often arise.

Usually an abscess has already formed before the case is seen, and in that case all that is necessary is to make a large vertical incision into the most prominent part of the swelling, excavate the contents and insert a large drainage-tube. When the incision has nearly healed, attempts should be made to cure the remainder of the infected gland by washing out through the duct. Only if this fails, and in cases where recurrent abscesses continue to arise, so that the patient remains a gonococcus carrier, should the gland be excised.

Six cases of abscess occurred in 382 non-gonococcal cases, which were opened and drained and all cleared up completely. In five of these cases no gonococci could be found in any part of the tract. Bartholin's abscess can, therefore, arise entirely apart from gonorrhoea. This was shown in a most striking manner in one remarkable case. A girl complained that for six days she had noticed pain on micturition, increased frequency of micturition, and a swelling on the left side of the vagina. The urine contained pus and a pure culture of the paratyphoid bacillus. An abscess of the left gland of Bartholin was discovered and incised. The pus also gave a pure culture of the same bacterium. The abscess healed satisfactorily.

In 223 gonococcal cases, 10 instances of abscess of Bartholin's glands were met with, which were opened and drained. In seven cases complete cure followed, two cases failed to attend till cure could be proved, and in one case of chronic abscess complete excision of the gland was necessary to obtain a cure. The need to excise the gland for abscess has, therefore, been exaggerated. Excision is only needed for cases of chronic relapsing abscesses.

Cysts of Bartholin's Glands

The clean removal of a Bartholin's cyst or chronic abscess without leaving any infected tissues behind, and without dangerous bleeding, is not an easy operation.

The patient should always be admitted to a ward. On no account should the operation be done at 'out-patients' as is often the case. Full anaesthesia, and therefore a proper preparation in hospital, are required. Careful disinfection and shaving of the parts are needed, as for any other operations on the female perineum. This can only be secured in hospital. A good light and adequate tools are required, and considerable experience and skill.

Norris advises as a preliminary the injection of methylene-blue stain into the duct, so as to stain and define the glandular substance and the wall of the cyst. A vertical incision is made over the centre of the swelling on the inner surface of the labium majus. The cyst must be most carefully dissected out without rupture. Rupture will probably spoil the operation, as a portion will be left behind. The hinder and lower portion is carefully freed from all its connexions, and the gland is then pulled upwards and forwards, so as to define the duct and remove it likewise. A ligature is placed round the extreme anterior portion of the duct and the whole gland removed.

If, unfortunately, rupture should occur, remember that the contents are sterile and do not matter. What matters is to get all the gland tissue out. Pack the cyst with gauze so as to define its lining, and continue its dissection.

The common complication of the operation as performed in our London hospitals at 'out-patients' is haemorrhage. This is not to be wondered at when we consider that the cyst or gland lies embedded in erectile tissue, consisting largely of venous spaces and supplied by the artery to the bulb, an artery of not inconsiderable size.

Every bleeding-point must be exposed fully in a good light and receive attention. When all the main bleeding-points have been ligatured, then the whole cavity should be carefully obliterated by means of No. 1 catgut stitches run through the walls in series, and tied so as to obliterate the cavity and all

dead spaces. If this is properly performed there can be no bleeding into a dead space left beneath the surface stitches. Stitch up the incision in the vulval lining membrane with No. 1 catgut. It is not wise to use silkworm gut in the vagina. A stitch may be left behind, and the husband will have cause for complaint.

CHAPTER IV

THE DIAGNOSIS AND TREATMENT OF URETHRITIS AND ITS COMPLICATIONS

URETHRITIS

Anatomy

However great are the disadvantages and disabilities of being a woman, nevertheless in one anatomical feature the woman rejoices, namely, in the possession of a short and simple urethra, which when diseased presents an easier problem than the long and complicated urethra of the man.

The female urethra is a curved canal with its concavity lying upwards and forwards, measuring one and a half inches in length, and lying for the most part embedded in the anterior vaginal wall, through which it can be felt as a thickened cord. It leaves the neck of the bladder as this lies on the deep layer of the triangular ligament, pierces the two layers of the triangular ligament, and finally lies embedded in the anterior vaginal wall. The meatus urinarius is the narrowest portion of the canal, usually admitting a bougie of calibre 24 Charrière, and in its virgin state is surrounded by two prominent lips, so that it presents the appearance of a vertical slit or of a circular button. Behind the meatus the canal is of larger calibre and can easily admit bougies of 24–30 Charrière.

The urethral mucous membrane consists of a stratified transitional epithelium lying on a loose fibrous basement membrane. This is surrounded by an inner longitudinal and an outer circular layer of muscular fibres. The middle portion of the canal is embraced by a voluntary striped muscle, the compressor urethrae, which lies between the two layers of the triangular ligament. The hinder portion is surrounded by a well-developed involuntary sphincter muscle, the internal sphincter of the bladder. This relaxes in response to inhibitory reflexes set up by contractions of the detrusor muscle. The longitudinal fibres cause the mucous membrane to be thrown into longitudinal folds. Under air distension these are obliterated and the outer circular fibres can be seen. Under high distension these also disappear, so that the mucous membrane appears a pale yellowish

pink, and quite smooth and flat. It is stated in the anatomical text-books and in some surgical text-books that the female urethra possesses great dilatability. It is true that the urethra can be dilated to a large calibre, but it is also true that if this is carried out to a greater degree than 35 Charrière the sphincter muscles may be torn, and the patient may never be able to hold water again. I cannot too strongly urge upon my younger readers not to dilate the urethra beyond a calibre of 30–35 Charrière, and I would warn them to pay no heed to the usually accepted teachings on the subject. Before the days of the lithotrite and operating cystoscope, surgeons were accustomed to insert their fingers through the urethra into the bladder. There can be no possible excuse for doing this at the present day.

Stones or foreign bodies should never be dragged through a urethra too small to permit of their easy passage. It is always preferable either to crush, or if the foreign body is uncrushable, to remove by supra-pubic incision of the bladder. Stitches ulcerating through into the bladder after gynaecological operations can be removed with the operating cystoscope. I have done this on several occasions.

It is also stated in some surgical and anatomical books that the female catheter should be passed by feeling for the opening of the urethra. This is disastrous teaching, and is the cause of many a cystitis and ruined bladder.

If it is necessary to pass a female catheter, place the patient on the back with the legs widely separated. Open out the labia and with a good light actually see the external opening. Then pass the female catheter straight into the opening without rubbing it on the vulval mucous membrane. Accuracy is surgically cleaner than decency. Cease prodding in the dark through a sense of false modesty. After passing a female catheter always wash out the bladder with 1/4000 oxycyanide of mercury, and leave a little of the lotion behind in the bladder. In this way you will prevent cystitis.

Even at the present day the passing of a catheter is usually left to a nurse. I cannot too strongly condemn this procedure. Cystitis often follows, because no attempt is made to wash out the bladder afterwards, as described above. The number of bladders ruined by this procedure that I am called upon to

see in the course of each year is a large one. The doctor should pass the catheter himself.

The urethra is not entirely a simple tube, but it usually possesses a few ducts, which end either blindly or else in mucous glands provided for the purpose of lubrication, so as to keep it moist and permit its collapsed walls to open up easily for the passage of urine. The urethra is therefore a moist tube, not a dry tube, and always possesses a 'secretion' which may be taken for a 'discharge'.

Just within the external opening there open on the floor two blind ducts called Skene's tubules. In addition there may exist in any portion of the canal, but chiefly on the floor, similar smaller ducts and glands, often called 'lacunae' or 'follicles'. Occasionally para-urethral ducts and glands are present, lying embedded in the tissues which surround the external meatus. In 605 cases only two instances of Skenitis were encountered, so that too much stress should not be laid on these facts.

In some women, and especially in elderly multiparae, the urethral lips are torn and puckered, with prolapse of the mucous membrane. Prolapse appears as a red ring of pouting mucous membrane, or as a red tongue or tag protruding from the floor. In severe cases ulceration and necrosis may ensue. These prolapsed portions are often extremely tender, and cause painful micturition. These appearances should be sharply distinguished from true caruncle. A true caruncle is a sessile tumour, in appearance like a small raspberry, tender to the touch, and liable to bleed on the slightest provocation. Caruncles are difficult to remove completely by a cutting operation, and therefore tend to recur or be replaced by a stricture. For many years I have been in the habit of destroying them with the diathermy current. This current destroys the root of the tumour and prevents recurrence or subsequent stricture formation. Diathermy should replace cutting operations for urethral caruncle.

Acute Urethritis

In virgins or young persons who consort with an infected male the urethra seldom escapes direct infection, for obvious reasons. But in older persons with larger and easily entered vaginas the urethra may escape, and the cervix alone become

infected. In 223 cases of gonorrhoea, 165, or 72 per cent., had urethritis, as compared with 142, or 67 per cent., who had cervicitis.

Urethritis in the female is usually of gonococcal origin, but we have seen a number of cases where a urethritis has been set up by other bacteria, such as the colon bacillus, a streptococcus, and rarer ones such as the pneumococcus or the paratyphoid bacillus. In 382 non-gonococcal cases, 72, or 20 per cent., had a mild urethritis. These are usually descending, haematogenous infections, are not infective to the male, and are set up by a primary blood infection of the kidney.[1] Less often they are initiated by a septic catheter, a dirty pessary, or a dirty douche nozzle, and especially by the whirling douche, which is a popular and widely advertised, but highly dangerous, toy. Others are the result of bruising of the urethra incidental to childbirth.

Acute gonococcal urethritis, after an incubation period of a few days, runs a definite self-limited course just as in the male, and tends at the end of three or four weeks to die down in the course of nature, and either clear up altogether by natural resolution or become chronic. It runs a far less severe course than in the male, largely because there is no complicated deep urethra draining prostate, vesicles, and testicles.

The gonococcus starts an inflammation at the entrance of the canal, which quickly spreads backwards to the deep urethra and to the trigone of the bladder. Beyond this point it hardly ever travels. Gonococcal cystitis is very uncommon, and ascending gonococcal pyelitis is practically unknown. We only met with one instance of gonococcal cystitis in 223 cases of gonorrhoea, and not a single case of pyelitis.

There need therefore be no dread of 'driving the disease back to the bladder and kidneys', that favourite teaching phrase of the incompetent and inexperienced teacher, which has caused so much human misery. Even if lacunae and follicles are present these usually escape infection. Only in rare cases do the follicles become infected and cause delay in healing. We met with one case of Skenitis in 223 cases of gonorrhoea.

[1] See *Common Infections of the Kidneys*, Frank Kidd, Oxford Medical Publications, 1920.

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Mild degrees of fibrous stricture are not uncommon as a sequela of chronic gonococcal urethritis, but usually escape notice. In searching for cases of dysuria and increased frequency in women this fact should not be lost sight of. Severe degrees of fibrous stricture are certainly rare. I have given a coloured photograph of one, a stricture in the female urethra, on page 100 of my book, *Common Infections of the Kidney*.

Symptoms of Acute Urethritis. The chief symptom is a burning pain experienced as soon as micturition is started, which lasts throughout the act, and ceases as soon as the act is over. This pain differs from the sensation experienced when the patient is suffering from colon-bacillus pyelo-cystitis. In that case no pain or burning in the urethra is felt at the start of micturition, but just at the finish an intense pain comes on which lasts for some minutes after the act is finished. There is seldom any complaint of increased frequency of micturition in gonococcal urethritis, as a contrast to the intense strangury and increased desire to micturate experienced in acute colon-bacillus pyelitis. In acute gonoccocal urethritis there is seldom any fever, in acute pyelitis there is always fever. I am laying stress on these points, as no mistake is more common than to mix up these two entirely different diseases, a mistake fraught with many evil consequences.

If the patient is not seen till the later stages of the disorder she may not complain of burning micturition. But if questioned she will usually recall the fact that a few days after the infecting act of coitus she noticed burning micturition. In the Middle Ages gonorrhoea was called the 'Burning', a word which expresses admirably the most prominent symptom of acute urethritis in the female. A purulent vaginal discharge accompanies the 'burning'.

Physical Signs and Diagnosis of Acute Urethritis. The patient is placed on the examining chair with the legs widely separated and the parts exposed to the rays of a head-lamp. Inspection reveals a reddened, prolapsed, pus-covered mucous membrane pointing through the lips of the urinary meatus (see Plate II *a*). The parts around are inflamed and covered with pus. A drop of yellow pus may be seen exuding from the meatus. Milk the urethra from behind forwards by means of a gloved finger through the vaginal mucous membrane.

Be gentle, as it is very tender. Yellow, or sometimes blood-stained, discharge will appear at the meatus. This should be caught up on a platinum loop, spread out on several glass slides, stained and examined for gonococci or other bacteria. Should no discharge appear at the meatus, insinuate the platinum loop within the urethra and obtain a specimen of its secretion for microscopic examination. Keep a sharp look out for little abscesses arising in para-urethral canals or in Skene's tubules. If these are large they can often be felt as little, tender, pea-like nodules, lying beneath the urethra or in its immediate neighbourhood.

Two-Glass Test. At this point I advise that the patient be asked to pass water into two glasses. This can be done, the nurse holding the two glasses in position as the patient lies on her back on the couch; or the patient can rise and pass water *standing* into the two glasses, in Arabian fashion. If both glasses are absolutely clear of purulent haze (exclude phosphates and urates), then it is unlikely that acute urethritis is present. If the urine is clear but contains heavy yellow threads, chronic urethritis is present. If the first glass contains a purulent haze and the second is clear, then there is probably no cystitis or pyelitis, and the urethral discharge is not very profuse. If both specimens are hazy with pus, then either the discharge is very profuse, or else there is cystitis or pyelitis. If there is no pus in the urethral films, or if these films show pus cells and the presence, not of gonococci, but of the colon bacillus or other germs, then it is in all probability not a case of primary urethritis, but a case of pyelitis. If fever and increased frequency are present, or even increased frequency alone, then the latter diagnosis is the more probable. In such cases, after excluding the gonococcus in other parts, refer the case at once to the genito-urinary surgeon, who possesses expert knowledge of pyelitis and its treatment. Such cases should not be kept a moment longer than is necessary in a venereal clinic. Bearing these differential points in mind, you will seldom be unable to make an accurate diagnosis as to whether a gonococcal urethritis is present or not; in case of doubt you should make at least three consecutive examinations on different days before concluding that the gonococcus is not present. In acute cases gonococci are usually found at once in the first film examined.

a

Acute Urethritis.
Purulent Discharge.

b

Bartholinitis.
Macule of Sänger.

Treatment of Acute Urethritis. The general management of the case is the same as described above (p. 21). Rest in bed is the ideal, and if it can be attained an acute urethritis will tend to resolve naturally, a rare event, or become chronic, the common event in the course of three or four weeks. Its natural course can, however, be shortened by suitable local treatment.

Local Treatment. In very acute cases with profuse urethral discharge and intense burning micturition it may be advisable to postpone all local treatment until the sharpness of the inflammation has subsided in the course of nature. In such cases an alkaline mixture containing sandal-wood oil given four to six times daily is of service. A suitable mixture contains potassium citrate 30 grains, potassium bicarbonate 15 grains, sandal-wood oil 7 to 10 minims, mucilage sufficient to suspend the oil, and water to an ounce. If this mixture causes pain in the stomach or pain in the back, it should be altered at once, the alkali being exhibited without the sandal-wood oil.

In the average acute cases of a moderate degree of severity we carry out urethral irrigation from the start (see p. 24). In such cases it is necessary to employ weak concentrations of potassium permanganate. Start with 1/4000 and work up gradually to 1/2000 or even 1/1000. If the irrigation causes increased pain or increased discharge, it is too strong. Employ weaker concentrations. If, on the other hand, it diminishes the pain and the discharge, gradually work up to such a concentration as will cause the urine to become clear and the pain to cease.

The irrigator is raised to a height of 2 to 3 feet above the level of the urethra and is filled with 2 pints of fluid. The special urethral nozzle (see Fig. 4) is gently introduced for a distance of 1 inch into the urethra, and the fluid allowed to run until the best part of a pint has been used. The nozzle is then gently worked forwards until it reaches the bladder, when about a quarter of a pint of fluid is allowed to run into the bladder and is left there. The rest of the lotion is then used for irrigating, with a vaginal nozzle, the vagina and vulva. The patient then rises and micturates, and in so doing sweeps the whole passage clear from behind forwards.

We have never seen any evil result from urethro-vesical lavage in the female; and we can only aver that those who try it for themselves cannot fail to be impressed with the immediate and progressive improvement in their cases, especially if they are dealing with gonococcal joints. In the majority of our cases urethral irrigation has brought about a complete cure of the urethritis in the course of three to four weeks. In 165 gonococcal cases the average time for cure was ten weeks. Once the urethra is cured there is no need to go on treating it, even though the cervix be still uncured. In some cases the disease enters a chronic stage, the causes and treatment of which are outlined below.

Urethral irrigation is carried out daily in our clinic by volunteer nurses specially trained. The patients attend at a fixed hour and so are not kept waiting. At one time we taught the patients to carry out urethral irrigation for themselves, using a mirror. The results were satisfactory, but cure was not obtained so quickly as when the treatment was carried out by a nurse specially trained to the work. When the service of a trained nurse cannot be obtained, it is permissible to teach the patient to irrigate for herself.

At the end of three weeks to four weeks the treatment of the urethra is discontinued for some days so that tests can be made. If the urine remains clear and the urethral films remain free from pus and gonococci, then there is no need for further treatment of the urethra, even though the cervix is not cured. If, on the other hand, purulent discharge reappears, the disease has entered on a chronic stage and requires special treatment.

Chronic Urethritis

In the untreated infected female the gonococcus tends to linger longer in the urethra than in any other part of the urogenital tract, though it causes few, if any, symptoms. The woman, therefore, returns to her evil ways, and becomes an infector of many healthy males. The gonococcus-carrier is typically the female with a symptomless chronic urethritis. When accused by some wretched male dupe of having given him gonorrhoea she professes indignant innocence, says she has never been astray with any one else, practically infers that he is her seducer, that he alone has been able to conquer her

weakness because of the strength of her passion for him, and rushes off to some doctor friend unversed in woman's ways, who examines a vaginal film (*vide antea*), and of course, finding no gonococci, passes her as an innocent, outraged, and clean victim of man's animal passions, on the strength of one examination. The poor male dupe is often so innocent, and believes so devoutly in the pure and single-minded love of his fairy, that I have known many an infected male trust to the old water-closet theory, get cured of his infection two or three times and return again to his old flame, who he protests is innocent. After two or three attacks have occurred immediately after his return to his inamorata, even the most trustful male becomes convinced, and realizes, perhaps too late, that, in the words of Fielding in *Joseph Andrews*, his innocent flame burns for him and he will continue to burn for her as long as he continues to carry his candle in her direction.

There are usually no symptoms of a chronic urethritis that are noticeable to the patient. Occasionally she is aware of a certain uncomfortable sensation of itching, as if an insect were crawling about inside the urethra. Sometimes she notices slightly increased frequency of micturition in the daytime. Less commonly a chronic trigonitis of gonococcal origin will cause troublesome frequency, and even pain, at the end of micturition.

In cases suspected of chronic gonococcal urethritis at least three careful examinations of the urethra must be made before it can safely be concluded that the gonococcus is not present. The patient must have held water, preferably all night, or at least four to six hours. The urethra is milked with the gloved finger, and a platinum loop inserted into the urethra. Not only films, but cultures on suitable media should be made of whatever secretion can be thus obtained, even though it may appear to the naked eye as a non-purulent, glycerine-like, or faintly opalescent jelly. If the microscope reveals pus in the films, this fact should lead to the most meticulous care in excluding gonococci. Nevertheless, a few pus cells may hang about in the urethra for a long time after the gonococcus has disappeared, due to the irritation of long treatment, or sometimes to the use of septic instruments and the implantation of secondary germs (staphylococci, diphtheroids, streptococci, *Bacillus coli*). If no pus is present it is unlikely that the gonococcus still lingers, yet

we have met with a few rebellious cases where long after all pus has disappeared the gonococcus has persisted in the most obstinate fashion. These cases are perhaps the only ones that should be labelled technically as 'carriers'.

In chronic urethritis the urine is usually clear of any purulent haze, and merely contains a *few heavy, sinking, yellow threads*, which should be fished out and submitted to microscopic examination. If the urine contains merely a *few light, glycerine-like, floating threads*, it is unlikely that the gonococcus is present. If it is absent, these threads can be neglected and *need no treatment*.

Treatment of Chronic Urethritis. If a urethritis has not cleared up completely after four weeks of irrigation treatment, it may be considered to have entered on the chronic stage. Let the patient pass water and mount the examination chair. Sterilize a set of female urethral metal bougies. Lubricate them with lubafax or K-Y lubricant. Never employ an oily lubricant. Pass them in series from below upwards. In this way, in the course of a few sittings at intervals of four or five days, the urethra will be dilated up from 20/22 up to 30/32 or even 32/34 Charrière. Such dilatations hasten cure in a striking manner, and also facilitate urethral painting. Now having sterilized a short urethroscopic tube and obturator $2\frac{1}{2}$ inches long and of a calibre of 22, 24, or 26 Charrière (see Fig. 3), as large as the particular urethra will comfortably admit, lubricate the tube with lubafax and pass it into the urethra until it reaches the neck of the bladder, or even the bladder itself. Withdraw the obturator and allow any excess of urine to fall out of the tube. Then take a metal or wooden stick on to the end of which has been twisted securely a pledget of sterile cotton wool.[1]

[1] It is most important to train the nurses to twist the cotton wool securely on to the stick. A metal stick with a serrated end is best, but cheaper sticks can be obtained, made of wood of suitable size and length. The best wool must be obtained for this purpose, very soft and of great length of fibre. Cheap wool of short length is dangerous. On the gloved finger flatten out a piece of wool to about the size and shape of half a crown, moisten the tip of the stick, place the tip in the centre of the disk of wool, rotate the stick, gradually twisting up the wool along the serrated portion of the stick until it is quite firmly held. Test it to see that it cannot be pulled off and left in the bladder. A number of such sticks can be prepared, placed in a tin, sterilized by dry heat, and kept ready for use. If a portion of wool comes off in the urethra, as has not happened in our clinic, it will

Dip this into a solution of silver nitrate, 5 grains to the ounce of distilled water, and pass it through the tube to the neck of the bladder. Withdraw the tube, leaving the mop in place. Now slowly twist and withdraw the mop on the stick so as to paint out the whole length of the urethra. This is repeated two or three times a week. At each sitting the strength of silver nitrate is increased until a strength of 40 grains to the ounce has been reached. This treatment will usually suffice to cure the majority of the chronic cases in a few weeks. If it fails, then urethroscopic examination must be carried out to detect complications, such as infected follicles.

In the clinic we usually shorten the manipulation by dispensing altogether with the urethroscopic tube. As we withdraw the last bougie we hold ready a cotton-wool stick soaked in silver nitrate solution and push it back into the urethra, leave it there a moment and then gradually withdraw it.

Out of 223 cases of gonorrhoea, 165 had urethritis, and of these 30 attended until the urethra was apparently cured on the evidence of film examination alone, and 112 attended until proved cured by complete cultural examinations.

Complications of Urethritis.

1. Infection of blind pits or glands on the floor, Skene's tubules, lacunae, follicles.
2. Infection of para-urethral pits or glands.
3. Suburethral abscess.
4. Stricture.
5. Polypus.
6. Congenital pouches.

1. *Infection of Skene's Tubules.* Skenitis occurred only twice in 605 cases, one case gonococcal, one non-gonococcal. When one or both Skene's tubules are infected, the lips of the meatus are usually everted and pouting, so that the floor of the urethra is slightly prolapsed, and the orifices of Skene's ducts are visible to the naked eye. The mouths of Skene's tubules, if inflamed, appear as red areolae, in the centre of which can be seen an opening which exudes pus, especially if the urethra is gently

be passed naturally at the next act of micturition. If by any chance a piece were left in the bladder, and were not passed naturally, it could be sucked out by means of an evacuating catheter, or extracted by means of the operating cystoscope.

massaged from below. When the orifices are not clearly seen, they can be exposed by means of two retractors made by bending two hairpins, or with Lucey's speculum (Fig. 3). With these the lateral walls of the urethra are held aside, and the floor is brought into view. A single hairpin can be used to massage the glands from behind forwards.

Fig. 6. Single-point cautery for burning out fine ducts.

In some cases the tubule is swollen with pus and forms a little tumour which projects upwards and forwards through the urethral orifice. If the tubules are infected, probe them with fine probes until their openings are well defined. Then heat a probe on a spirit-lamp and fuse a little pure nitrate of silver stick on to it. Pass this well into the duct to its extreme limit and burn out the gland with the caustic. If this treatment fails, we are accustomed to insert a fine cautery point into the duct and rapidly burn out the gland. This cautery consists of a single platinum point, and has been made for us by Schall, of 76 New Cavendish Street, London. It is very sensitive, and needs great care in handling (see Fig. 6).

In exceptional cases a small suburethral abscess will arise as a result of this infection. In that case open up the abscess either suburethrally across the vaginal wall, or by inserting a canaliculus director into the duct and slitting open the duct till pus is freely struck on the floor of the urethra. These abscesses are not abscesses in the true sense, but are pockets lined with epithelium and filled with pus. Mere incision and drainage may, therefore, not be sufficient. After evacuating the pus the whole 'abscess cavity' must be burnt out with the cautery or the diathermy needle.

In some cases the duct can be slit up to its very end so as to turn the cavity of the tubule into a portion of the floor of the urethra, when there is no need to cauterize.

It is possible to syringe out the duct by using a fine hypodermic needle and syringe. This treatment is not likely to be so successful as the use of the silver nitrate probe or the actual cautery, nor is it less difficult to carry out.

2. *Para-urethral Canals.* These correspond exactly to the para-urethral canals met with so frequently around the male urethra. They are produced during foetal life by misdirected attempts of the ectodermic epithelium to grow inwards towards the bladder and build the urethra. They are blind pits lined by epithelium, and may lie in any portion of the vaginal wall that surrounds the urethral opening. They may be single or multiple, and if they are infected, pus can be seen issuing from their mouths, which are surrounded by a red areola. A fine cautery, or a silver-nitrate-covered probe, or a fine diathermy needle can be introduced into their depths, whereby a cure is usually obtained at one sitting.

3. *Suburethral Abscesses.* These may arise from an infection of Skene's tubules, or of ducts or glands lying nearer the bladder on the floor of the urethra. The inflamed duct is blocked by fibrous tissue laid down in its walls, so that the deeper portion of the gland or pit becomes distended with pus, and its wall surrounded by exuberant fibrous tissue. If left to themselves these abscesses burst, and may give rise to troublesome and far-spreading fistulous tracks, which open a long way from their point of origin. At other times the pus gets shut up within its epithelium-lined sac, and lies dormant for months or even years. At any time it may light up, burst forth, and cause the sudden appearance of an apparently fresh gonorrhoea. Wherever suburethral swellings are detected, either acute or chronic, they should be freely opened at the most accessible and dependent spot. When the pus has been evacuated the epithelial wall should be burnt out with the actual cautery or the diathermy needle, or failing that by silver nitrate fused on a probe.

4. *Stricture of the Urethra.* Mild degrees of stricture of the urethra are not so very uncommon as a result of gonococcal urethritis. Up to the present time their presence has seldom been suspected or detected, because they have not been looked for. Mild degrees of stricture may cause irritability of the bladder, a feeling of difficulty in urination, and in some cases, very severe pain. I have seen several cases of retention of urine in women as a result of fibrous stricture. Pain, if it is complained of, is usually a mild, dull ache above the pubes, but it may consist in intense discomfort throughout the act of micturition. The diagnosis is difficult. There is often no

definite history of gonorrhoea, as the infection that caused the stricture has probably been a mild one, where both husband and wife have nursed the gonococcus, and have lived together with it in complete connubial bliss for many years.

These cases generally come up to the genito-urinary surgeon complaining of too frequent, difficult, or painful micturition. An examination is made to exclude a chronic pyelo-cystitis. It is found that the urethra is narrowed and refuses to admit an ordinary cystoscope (23 Charrière). A child's cystoscope is substituted, and a view obtained of the bladder. The bladder and kidneys are healthy, but there is a chronic trigonitis. The treatment consists in gradual dilatation of the urethra followed by instillations of silver nitrate. In some of these cases the urethra is extraordinarily tender, so that a general anaesthetic may be required for the first few treatments. Why this should be so I do not know, but I have noticed the fact. The most tender and painful urethras I have ever seen have been in this kind of case. In less tender cases it suffices to anaesthetize the urethra with cocaine. Dip a sterilized cotton-wool-covered stick into a few drops of sterilized 10 per cent. cocaine solution. Gently insinuate this into the urethra and leave it in place for five minutes. It is then possible to pass urethral bougies in gradually increasing sizes. In severe cases I finish the course by dilating the urethra to 35 Charrière with an irrigating Kollmann's dilator.

Severe cases of stricture are extremely uncommon in the female urethra. I have written out a full account of a case of stricture in the female urethra in my book, *Common Infections of the Kidneys*, p. 100, and I have seen a few other cases. Probably in prostitutes the incidence would be higher, but prostitutes do not seem to attend for skilled treatment. We see few, if any, of them at our clinic.

A stricture should be visible on urethroscopic examination, but so far we have not encountered one during routine urethroscopy. The only time a doctor is likely to encounter a stricture is if he is called in to treat acute retention of urine in the female. The common causes of acute retention in the female are obstructions to the urethra by pelvic tumours, such as the retroverted gravid uterus, fibroids and carcinoma of the uterus, and functional retention after operation or childbirth. If the

cause is stricture of the urethra an ordinary glass female catheter will not pass. Attempts can be made to pass fine glass female catheters, or the urethra can be rapidly dilated up with bougies. Hegar's bougies can be used for this purpose, or the obturators of urethroscope tubes. I possess a set of metal bougies specially made for me by Montague, for use in the treatment of stricture or trigonitis in the female.

Dilatation of Stricture. The bladder should first be filled with oxycyanide of mercury solution 1/4000, injected through a catheter or urethral irrigating nozzle. Hegar's bougies, or nickel bougies, are lubricated with lubafax or K-Y lubricant and passed in gradually increasing sizes. Finally, the curved irrigating 3-branch Kollmann's dilator as designed for the male is employed to finish off the treatment. The female urethra should be over-dilated to 35 Charrière and no more (not to 45 Charrière as in the male). The patient should be encouraged to report once a year to make certain that the cure is permanent.

5. *Polypus.* Long-stalked granulomatous polypi, the result of chronic gonococcal urethritis, were met with in three cases. All needed excision before a cure could be obtained.

6. *Congenital Pouches.* One case of congenital pouch was encountered. The pouch lay on the floor of the urethra about half an inch from the external meatus. After the urethra had been washed clear, about a drachm of infected pus could be milked out of it. Its orifice could be seen with the urethroscope. It was finally cured by emptying it daily and instilling into it strong silver nitrate up to 40 grains to the ounce.

Carcinoma of the Female Urethra

This is an exceedingly rare disease, but is met with sufficiently often to deserve mention. It is encountered in elderly females as a hard lump growing from the floor of the urethra, and leads to difficulty in micturition accompanied by haematuria and pains above the pubes. It consists of a squamous-cell carcinoma containing cell nests, which resemble the histological pictures of carcinoma of the renal pelvis and ureter rather than of carcinoma of the skin. In the early stages it reacts favourably to radium treatment. In its later stages diathermy gives results superior to operation, which, owing to anatomical features, is almost impossible.

The Urethroscope in the Female

Routine urethroscopy is perhaps not so necessary in the case of the female urethra as it is in the case of the male, and is usually reserved for rebellious cases which fail to clear up on the treatment outlined above. Nevertheless, during the last year or two we have employed routine urethroscopy in the majority of cases before passing them as cured, if only for the sake of excluding stricture.

In very sensitive women a general anaesthetic may be employed, but usually a complete examination can be made under local anaesthesia. Empty the bladder with a catheter, inject 2 drachms of a 5 per cent. novocain nitrate solution into the bladder, and leave it there for fifteen minutes. Take a sterilized cotton-wool mop on a stick, dip it into a few drops of 10 per cent. cocaine solution, and insinuate it into the urethra and leave it there for ten minutes. These steps usually give sufficient anaesthesia for purposes of urethroscopy.

For urethroscopic examination a special position of the couch is necessary (see Fig. 7). The patient lies with the back sloping downwards, and with the hips and buttocks well raised (the Kelly position). In this position air can enter the bladder, and any drops of urine lying in the bladder tend to fall backwards into the fundus of the bladder instead of into the examining tube. The urine is drawn off by a glass catheter. For routine examination we use the Wyndham Powell urethroscope and air distension. A sterilized urethroscopic tube and obturator $2\frac{1}{2}$ inches long and of a calibre of 24/36 Charrière is lubricated with lubafax and is passed as far as the bladder. This tube is made specially for us, being slightly tapered and not conical, so as to prevent the escape of air. The obturator is withdrawn, any excess of urine allowed to escape, and then the lighting attachment is fixed in place on the mouth of the tube, and air immediately permitted to flow into the tube by turning the tap leading from the air bellows. The bladder becomes distended with air, and a perfect view is obtained of the ureters and trigone.

The tube is now gradually withdrawn into the urethra. As this is done, the internal sphincter is seen to close behind the tube, and there is now revealed the wall of the urethra itself blown out with air. The air distension obliterates the natural

longitudinal folds of the urethra, and only the circular folds of the urethra are dimly seen. In a normal urethra the mucous membrane glistens with mucus, is flat and smooth, and of a yellowish-pink colour. A few longitudinally arranged blood-vessels can be seen, and also the pale glistening openings of the ducts or lacunae.

Fig. 7.—Position for urethroscopy.

In chronic urethritis, areas are met with where the urethra is reddened and swollen, and fails to dilate fully under air distension (intermediate type of stricture). There is subendothelial inflammation and hyperplasia. The treatment is dilatation by bougies. Fibrous crescents and circular fibrous diaphragms or strictures are seldom seen. In other cases there can be seen a red areola surrounding the mouth of a duct or gland out of which pus exudes. Sometimes the gland itself is swollen with pus so that its body bulges into the distended lumen proximally to the inflamed mouth of its duct. In such

cases it is possible to probe the mouth of the duct and destroy the gland with a probe coated with pure silver nitrate, but a different kind of urethroscope must be used. For this purpose we have adapted Hugh Young's male urethroscope for use in the female (see Fig. 8). A short wide tube is used, the light

Fig. 8.—Hugh Young's urethroscope modified by the authors for use in the female urethra.

and magnifying glass being so disposed that it is possible to manipulate a silver-nitrate-coated probe without air distension into the mouth of an infected follicle previously noted with the air-distension urethroscope.

In acute urethritis it is not wise to use the urethroscope. If it is used in such cases the urethra is found to dilate badly, to be red and inflamed, to be covered with pus, to bleed readily, and all fine details of its structure are lost.

Just as in the male, ulcers are never met with as a result of gonorrhoea in the female urethra. Those who describe ulcers must surely have made them by their manipulations.

We have described urethroscopy in detail, as it should not be neglected by the specialist. Nevertheless, we do not want to lay too much stress on it. The general practitioner will find that he can cure quite 97 per cent. of his cases of urethritis by the simple measures of irrigation, bougies, and paintings described above. Obstinate cases that resist such treatments had better be referred to a specialist.

CHAPTER V

THE DIAGNOSIS AND TREATMENT OF CERVICITIS

CERVICITIS

According to Menge, cervicitis occurs in 80 per cent. of the acute cases, and in 90 per cent. of the chronic cases of gonorrhoea. In our clinic, out of 223 gonococcal cases seen in adults, 142 had a specific cervicitis, or roughly 63 per cent. In 23 cases the gonococcus was not found in the cervix when it was found in the urethra.

The gonococcus is implanted directly into the cervix at the infecting act, and does not ascend from the urethra, vulva, or vagina. We have proved in a number of cases that pus and gonococci can be demonstrated in the cervical secretion a few days after a first and infecting act of congress. At first sight it would appear that the gonococcus once implanted into the cervix has nothing to stop it in its wild career towards the body of the uterus and the Fallopian tubes; and indeed the number of infected tubes removed yearly in our gynaecological clinics has led to such a conclusion being drawn by those who have little practical knowledge of gonorrhoea in the female. As a matter of fact, these *a priori* assumptions turn out to be baseless when tested by what actually does happen in the natural history of the disease.

In our clinic, in 142 cases of cervicitis, in eleven cases only had the disease spread upwards beyond the internal os. In eleven cases only did we meet with infection of the body of the uterus and the Fallopian tubes; and this was nearly always in cases where the disease had been allowed to run untreated throughout pregnancy. Parturition was the factor which had allowed the disease to spread upwards. Twenty-one cases of gonococcal cervicitis were also pregnant. These received cervical paintings, and all were cured before parturition supervened. Abortion only occurred in one of these cases (5 per cent.). We have learnt, then, that there is a natural barrier to the spread of the gonococcus beyond the internal os. What this barrier is we do not know, but that it exists we have no doubt. *This*

barrier only breaks down when parturition or miscarriage occurs, or, more rarely still, if a menstrual period comes on during the first week or ten days of a fresh acute gonorrhoea, and if the woman remains up and about under these circumstances.

The moral is to treat and cure gonorrhoea before pregnancy ends in parturition, and then the womb and tubes will escape infection. No effort should be spared to secure an early cure in those unfortunate girls who have made a single slip, and have become impregnated at one and the same moment not only with the gonococcus but with an illegitimate child.

Early treatment brings healthy tubes and more babies. Late and inefficient treatment brings sterility and major operations. The same holds true of virgins who have become married to a gonococcus-carrying male. Treat both victims early and cure them before parturition can occur. Then the tubes are saved, and the couple can have a number of children.

Gonorrhoea has been blamed as a common cause of sterility, and much stress has been laid on this point in propaganda. I would call the attention of the propagandists to the above facts. Gonorrhoea is usually not a cause of complete sterility, but is a common cause of one-child marriages. It need not even become this, if only the woman infected during her first pregnancy could be brought up for adequate modern treatment, be cured before parturition, and so left with healthy tubes to produce more children. Needless to say, the husband must also be brought to book and cured whilst his wife is undergoing treatment.[1]

Speculation is rife as to the nature of the natural barrier to bacterial ascent beyond the internal os, but is perhaps idle. In the course of evolution animals have developed a natural defence against the ascent of pathological bacteria from the external world up the natural canals and ducts which lead from the surface to the interior of the animal, such as the urethra, bile duct, salivary duct, and so forth. The real nature of this defence is unknown; but if we reflect we can see that it would be highly necessary for the survival of the species that the majority of their members should possess such a power. Were it not in existence a female would develop peritonitis every time the male organ, covered with germs, were thrust

[1] See *Common Diseases of the Male Urethra*, Frank Kidd.

as far as the cervix. A natural bactericidal barrier undoubtedly exists at the internal os, and the desideratum in preventing the upward spread of bacteria is to respect the internal os. It is the insult to the internal os at parturition, or after dilatation of the neck of the womb with tents or bougies, that leads to infected tubes and peritonitis. Again, before curettage a uterus may be sterile, after curettage it may swarm with germs. Dilatation of the cervix and curettage entail definite risks of infecting a previously sterile womb which should receive closer attention from the profession. Curettage is undertaken too lightly at the present day.

Some hypothecate as a cause a plug of mucus at the internal os which is supposed to act like a plug of cotton-wool over a bacterial test-tube. Some hypothecate the constant renewal of the uterine mucous membrane at the monthly periods which is thus enabled to throw off invading bacteria. It is more probable that bacteria do constantly ascend beyond the internal os, but that as soon as they do so they are destroyed or rendered inert by bactericidal influences resident in the natural juices and tissues of the womb.

We have laboured this point, as the fear of producing ascending infections of the uterus and tubes by means of treatment applied to the cervix has been the main cause in frightening off gynaecologists from trying to destroy the gonococcus early and often as it lies in the cervix. The same idea was seen in dealing with gonorrhoea in the male sex. The teaching was, 'Do not give injections, because they drive the disease back'. In our student days the student was told to sit on a cricket ball if he were so bold as to give himself urethral injections. Such is the harm that *a priori* ideas can do in preventing progress in medicine.

Pathology of Cervicitis

The normal and pathological anatomy of the cervix must be considered before a proper understanding can be obtained of the peculiar appearances met with in cervicitis.

The vaginal epithelium is a squamous epithelium of considerable thickness, lying on a thick layer of areolar tissue. As they spread over on to the protruding cervix this epithelium and its underlying tissue thin out progressively, till at the

entrance to the external os they are of extreme tenuity. Abruptly at the external os the squamous epithelium gives place to an epithelium of an entirely different nature, which is common to the whole of the cervical canal, and projects down into the folds or papillae of the arbor vitae, and into the deep mucous glands that lie in the thick areolar tissue lying upon the muscular wall of the cervix.

In the natural state the external os appears as a circular opening surrounded by the pale pink smooth squamous lining of the vaginal skin, through which none of the bright red succulent mucous membrane of the true cervical canal can be seen. In some vaginas, however, the junction of the two epithelia occurs at a point outside the external os. This is the origin and meaning of the so-called 'congenital erosion', which appears as a complete bright red circle surrounding the mouth of the external os. It is a complete and perfect circle and quite homogeneous in appearance. It is a variation from the normal, and is not of pathological import.

In *acute gonococcal cervicitis* a wide ring of red, angry-looking, oedematous, inflammatory swelling can be seen shining out from under the vaginal lining of the cervix (see Plate I *b*). As this dies down either ulceration occurs over the inflamed area, which is eventually covered in by the overgrowth of cylindrical epithelium and glandular tissue growing out on to it from the cervical canal; or, what is more likely, the external os becomes dilated and puckered by scar tissue, and portions of the cervical mucous membrane with its cylindrical epithelium and glands prolapse so as to become externalized on to the surface of the vaginal portion of the cervix.

Whatever its exact origin, at any rate there appears in the course of a few weeks an irregular red patch extending around a portion of the external os, the so-called 'cervical erosion'. A cervical erosion is commonly seen in chronic cervicitis, whether gonococcal or otherwise, and its features are soon learnt. In other words, a true cervical erosion is a clinical sign that points to a chronic cervicitis (see Plate I).

It is not an 'erosion'—that is to say, there is no ulceration or breach of epithelium. What has really happened is that an area on the vaginal portion of the cervix has ceased to be covered by squamous epithelium and has become covered by

cylindrical epithelium and glandular tissue. This is the nature of an erosion. An erosion is velvety to the touch, and does not bleed unless handled roughly. Its presence denotes chronic cervicitis. As the disease yields to treatment it usually disappears. Hence the great importance of recognizing it and of understanding its true nature. Out of 223 gonococcal cases, 48, or 20 per cent., showed erosions. Out of 382 non-gonococcal cases, 113, or 40 per cent., showed erosions. Erosion therefore does not necessarily mean a gonococcal cervicitis; it simply means chronic cervicitis, and is twice as likely to be non-specific as specific.

If cervicitis is of long standing, some of the ducts of the cervical glands may become blocked with pus, or strangulated by fibrous tissue. In this manner arise pus-containing vesicles or clear mucous retention cysts, the so-called 'ovula Nabothi', which may eventually prolapse as polypi through the external os, the so-called mucous polyps.

Clinical Course, Symptoms, and Signs of Cervicitis

Course.—Two or three days after the gonococcus has been implanted during congress within the cervical canal (incubation period), inflammation of the cervical mucous membrane ensues. The blood-vessels dilate and pour out a cellular exudation into the areolar tissue and on to the surface of the glands and epithelium. The cervix becomes hot, red, and swollen, and pours forth a copious, purulent, viscid discharge. The severity of the inflammation varies with the virulence of the germ, the general state of health and age of the patient, and as to whether or not she excites the inflammation by continued excesses of venery and alcohol.

In many cases the inflammation is subacute or chronic from the outset; at other times it is at first acute, but in the course of three or four weeks either resolves naturally and leads to natural cure; or, what is more likely, enters upon a chronic stage. In our clinic, cervicitis in an acute stage was seldom observed, as it had usually become chronic, being of considerable duration before the patients came up for examination.

Acute Cervicitis

Symptoms.—The only constant symptom of acute cervicitis is profuse vaginal discharge. Pain is seldom a marked feature,

but if present it consists of a dull ache felt in the middle line of the back at the upper portion of the sacrum. This is the typical area of 'cervix' pain. The pain of micturition overshadows the cervical pain. Acute cervicitis does not cause fever unless it is accompanied by enlargement and tenderness of the body of the uterus. This complication, which is brought on by exercise taken in spite of the onset of menstruation, produces slight fever and a great aggravation of the pain, which drives the patient to bed. Menstruation may, thereafter, become irregular and profuse, and a chronic metritis and oöphoritis persist.

Signs.—Examination by means of a speculum during the acute stages reveals a hot, swollen, reddened cervix, with angry, pouting lips, that bleed readily and are bathed in a tenacious, creamy, purulent exudation, that pours forth from the cervical canal (see Plate I *b*).

Chronic Cervicitis

Symptoms.—Chronic cervicitis presents few, if any, symptoms beyond a complaint of leucorrhoea or excessive vaginal discharge, which increases in quantity at the monthly periods, or during pregnancy. The discharge is cooler and thinner in quality than that of acute cervicitis, but it definitely stains the linen a pale yellow. It is only faintly acid or even distinctly alkaline.

Signs.—At this stage exposure of the cervix through a speculum reveals a characteristic picture. The cervix itself does not appear swollen or inflamed, but ropes of tenacious, yellow, purulent mucus exude in profusion from the cervical canal, and have to be swabbed away before a proper view can be obtained. There is then often revealed (20 to 40 per cent.) an irregular reddish patch which extends out for a short distance from the external os on to the pale pink surface of the vaginal cervix, but which seldom surrounds the os completely. This area is called a cervical erosion, is soft and velvety to the touch, but is tough and not friable, though it will bleed a little if handled roughly (see Plate I *c*).

As the disease clears up under treatment, or by natural process of repair, the 'erosion' usually disappears, when the mouth of the cervix may return to its normal appearance, or else may appear irregular and narrowed by scar tissue. It is

at this stage that clear retention cysts may appear, or even mucous polypi, bulging from beneath the vaginal portion of the cervix or from just within the cervical canal.

Diagnosis and Differential Diagnosis of Cervicitis

The diagnosis of acute cervicitis is readily made by the clinical appearance of the cervix.

The actual nature of the infecting organism is determined by means of films (and cultures) obtained from the cervical discharge. Out of 605 cases, in 142 the gonococcus was found; in 263 other pyogenic bacteria, particularly streptococci.

The diagnosis of chronic gonococcal cervicitis can only be made by means of films and cultures of the cervical discharge. The appearance or erosion is not specific, and is twice as common in non-gonococcal as in gonococcal cases.

Other conditions may give rise to an appearance of erosion, such as laceration of the cervix after childbirth or instrumental interference. The history and the film examination determine their exact nature.

The appearance of congenital erosion and its cause have already been explained. It is a red area which completely and uniformly surrounds a virgin cervix, whereas other erosions are irregular and do not completely surround the external os. Cervical erosion must also be distinguished from early carcinoma, syphilis, and tuberculosis.

1. Carcinoma.—The more advanced age of the patient, the history of bleeding rather than of yellow discharge, and the absence of painful micturition are helpful points. A carcinomatous ulcer is more friable and bleeds more easily than an erosion. Its edges are slightly rolled, irregular, and everted, its base invades the deeper tissues, and feels characteristically hard. In doubtful cases a portion of the ulcer can be submitted to microscopical investigation. Only three cases of carcinoma were encountered in 605 cases, one of which also had gonorrhoea.

2. Primary Syphilis.—During our study we have noted four cases of primary chancre of the cervix. It is often stated that the primary site of syphilitic infection in a woman cannot usually be detected, with a result that few women apply for treatment of syphilis until the onset of the secondary stage, when the diagnosis is obvious, but treatment prolonged and difficult. Out

of 605 cases, 44 were detected as suffering from syphilis mostly in its secondary stages, but in four cases the primary sore was seen on the cervix, and in six on the inner surface of the labium majus.

The importance of the diagnosis of syphilis in its primary stage and its bearing on early treatment and quick cure have been referred to above (p. 29). Those women who develop a double infection after impure coitus are more likely to get a quick cure of their syphilis than those who develop syphilis alone. If they develop gonorrhoea and apply at once to a clinic where adequate examination is carried out at once, their chancre can be detected in the first few weeks—that is, during the primary stage, when abortive treatment by salvarsan is possible.

A primary chancre on the cervix differs in no way from a chancre seen elsewhere. There is a small ovoid area of superficial ulceration, showing relatively few signs of inflammation and exuding a thin serous fluid. This area is surrounded by a very slightly raised and distinctly hard ovoid ring, which is caused by mild inflammation in the submucous tissues in the neighbourhood of the ulcer. Sometimes this hard, raised surrounding area is absent. A chancre may therefore present the appearance of an indurated papule, an ulcer, or an erosion.

A chancre is definitely an ulcer, and not a velvety mass of glandular tissue (erosion). It is situated usually on one or other lip of the cervix, though occasionally the external os may be the centre of the ulcer. It is usually single, but may be multiple. The ulcer develops within three or four weeks of the infecting coitus, and is followed almost at once by a shotty enlargement of both inguinal glands, the feel of which is characteristic. At this stage the Wassermann blood reaction is completely negative, and it seldom becomes positive before five to eight weeks have elapsed after the infecting coitus. We have been able to demonstrate the *Spironema pallidum* in the ulcer at this stage by the ordinary methods, and have been able to abort the disease by means of salvarsan before the blood has become invaded. In five to eight weeks the glands all over the body become enlarged, characteristically the epitrochlear and occipital glands, and the rash and sore throat appear.

3. Early Tuberculosis.—This is a rare condition, and only

met with once in 605 cases. It is more likely to be met with in young girls than in adults. There is a velvety ulcer, with ragged, undermined edges, which bleeds readily, accompanied by evidence of tuberculosis in the tubes, peritoneum, or other parts of the body, which enables a correct diagnosis to be made.

Treatment of Cervicitis

Acute Cervicitis.—Wherever it is practicable and possible the patient should be urged to take to her bed, and should be placed under the general regimen described above (p. 21).

In hyperacute cases the natural subsidence of inflammation must be awaited before active treatment can be carried out. In ordinary acute cases we have found nothing but good has attended our efforts to apply antiseptics to the inflamed cervix during the acute stages. As a result of experience we have grown bolder in this line of treatment, and lately one of us (A. M. S.) has dealt with private cases by daily swabbing of the cervix, and cure has sometimes been obtained in a week to ten days. In the clinic we have had to remain content with treatment applied twice a week, but wherever it is possible we advise daily treatment, or, as second best, treatment carried out every other day.

The patient is placed on the examining chair and the cervix exposed to sight. The excess of discharge bathing the cervix is swabbed away with wool held on sponge-holders. A Playfair's probe covered with sterile cotton wool is then gently twisted into the cervical canal until it is felt to ride up against the internal os. It is then twisted out of the canal again so as to rid the surface of the ropy tenacious pus which covers it. This is repeated till all the pus has been removed.

If the pus is unduly tenacious, dip the probe and wool in liquor potassae, 1 part in 5 of water, and leave in place for a few minutes. This softens and dissolves the pus so that it can be more readily displaced. *It is the most essential part of the treatment to get rid of all the tenacious pus before applying antiseptics to the bare mucous membrane.*

A mop of wool on a Playfair's probe is then dipped in a solution of acriflavine 2 per cent. in physiological salt solution, and is used to paint out the cervix two or three times.

The patient is tipped well backwards, and then half a test-

tube of this flavine solution is poured into the top of the vagina and allowed to soak back into the cervix. A tampon of gauze-covered wool with tape attached is then soaked in the flavine, placed against the external os, and left *in situ* for twelve hours. As the speculum is withdrawn the walls of the vagina and of the vulva are painted over with the flavine by means of a mop of wool held in sponge forceps, and the parts covered with a sanitary towel. The patient withdraws the tampon next morning by means of the tape, and washes away the excess of flavine by means of a hot saline douche (two teaspoonfuls of salt added to two pints of boiling water and allowed to cool). Following this, the urethra receives its daily irrigation with potassium permanganate solution. In our clinic the patient attends daily, and these manipulations are carried out by a specially trained and volunteer nurse. Applications of strong flavine can be repeated daily without any toxic effects and without causing irritation. It has been a most gratifying experience to us to see acute cervicitis and vaginitis yield in a few days to this treatment, and it will, I think, astonish those who will take advantage of this line of treatment to see how quickly all signs of acute inflammation disappear under it.

Flavine appears to possess a very low toxicity for human tissues, and yet to possess a very high bactericidal action. It appears to be diffusible and to spread deeply into the cervical glands and into the areolar tissues. We have tried numerous other chemical antiseptics, but none of them have yielded such potent and rapid effects as flavine. Flavine is far more potent than silver preparations such as protargol, argyrol, &c., and should be preferred to these preparations in the treatment of the cervix.

In a few cases flavine was found to cause irritation. These were hyperacute cases. In those cases we had resort to the use of a 10 per cent. solution of eucalyptus oil in sterile olive oil. This possesses a mild and sedative antiseptic action. As soon as it had produced an ameliorating effect on the hyperacute inflammation, a return was made to the flavine.

Treatment of Chronic Endo-Cervicitis

If the cases fail to clear up completely on the flavine treatment, or if they apply for treatment to the chronic stages, then

stronger antiseptics can be applied to the cervical canal, antiseptics of a caustic nature which are able not only to soak into the cervical glands, but also to destroy to a limited extent the surface of the mucous membrane. Under their influence the cervical canal becomes patulous, admits larger mops, and drains better.

The cervix is exposed as before, but liquor potassae is used in every case to soften the tenacious purulent mucus, which is harder to remove in chronic than in acute cases. Before completing this cleaning-out process we are accustomed to squeeze gently the lips of the cervix between the blades of the speculum or of a sponge-holding forceps. This seems to stimulate the cervical glands to pour forth an excess of secretion, and so washes them out with fresh tissue juices. This process is meant to imitate to a certain degree the process of massage of the prostate which we have found so successful in curing infected males. The cervical glands present a similar problem when infected to that of the infected glands of the prostate. By encouraging an abnormal flow of secretion we unblock ducts, empty deep glands, and encourage tissue interchange. When all secretion has been dried up, we paint the interior of the cervix twice a week with a selection from the following solutions, taking pains always to respect the barrier of the internal os:

1. Iodized phenol (B.P.).
2. Silver nitrate 30, 40, 50, and finally 60 grains to the ounce of distilled water. This is at once followed by an application of tincture of iodine (strong Edinburgh tincture). Silver iodide is formed and left behind in the canal.
3. Picric acid, saturated solution in spiritus vini rectificatus.
4. Pure ichthyol.
5. Formalin, 40 per cent.

Of these we prefer the first two. The application of any of the above should not be adopted before the end of six weeks from the inception of the disease. Sometimes we alternate these strong applications with the application of 2 per cent. flavine. Rather less than half of our cases were cured by the application of flavine alone, rather more than half needed the application

of the stronger caustic solutions. The average number of treatments required given twice a week was twenty-three—that is to say, the average length of time needed to cure a case of cervicitis was eleven weeks. In private cases, where the treatments can be carried out more frequently or even daily, this time can be considerably shortened. In favourable cases we have obtained cures in ten days.

In a small number of cases gonococci still persisted in the deeper portion of the canal, despite these efforts. We have then employed the following method of treatment:

1. Gentle dilatation of the external os by means of Hegar's dilators, followed by strong paintings as above.

2. A method recommended by Dr. Hobbs, namely, the insertion of a gauze tampon into the cervical canal soaked in linimentum iodi 3 parts, glycerine 1 part, and left *in situ* for six hours.

3. Administer anaesthesia. Dilate the cervical canal only as far as the internal os up to No. 10 Hegar. Scrape the cervical mucous membrane gently and superficially with a Volkmann's spoon. Paint out the canal with silver nitrate 80 grains to the ounce of distilled water.

Other measures have been advised for these troublesome cases, but we have had little experience of them:

1. *A suction apparatus*, after the method of Bier, applied over the cervix and followed by strong paintings.

2. *Ionization with zinc ions.*—This method of treatment is said to be highly effective. It needs special apparatus, and should therefore be reserved for chronic cases of cervicitis that resist the simple methods described above. It has been employed successfully by Dr. Agnes Savill, and the following description is taken from a paper by Dr. John William Burns.[1]

'The patient is placed in the dorsal position with the knees drawn up. A medium-sized glass Fergusson speculum is passed until the cervix fits into the upper end. The os is dried and cleaned by means of small sterilized gauze swabs. A swab for bacteriological purposes is then taken from the cervical canal. The reaction of the cervical canal is then taken by means of a

[1] *The Lancet*, October 14, 1922, p. 798.

roll of litmus paper. A malleable zinc sound is passed into the cervical canal for about 1 inch or 1½ inches, the speculum is half filled with 0·5 per cent. zinc sulphate solution. The zinc rod is connected with the positive pole of the galvanoset, the negative pole of which is applied to the patient's thigh by means of a metal plate superimposed upon two or three pads of gauze and lint wrung out of warm water. The current is slowly switched on and raised until the milliampèrameter reads 20 milliampères. It is allowed to run ten or fifteen minutes; the os and cervical canal will then be seen to be coated with a thick white deposit. At the end of the requisite period the current is cut off and the sound removed. The zinc sulphate is mopped out, and a strip of gauze soaked in acriflavine (1/1000) is introduced into the vagina and removed at the end of twenty-four hours. This treatment is repeated weekly for three weeks, during which no douching or intercourse is permitted. The external genitals are washed with warm soap and water night and morning and kept quite dry. Three applications are usually sufficient to render the cervical canal sterile.'

3. *Diathermy treatment.*—This method of treatment has been warmly advocated by Dr. E. P. Cumberbatch,[1] and by Drs. Miller and Maclachlan.[2]

In the hands of those who have made it a special study the results are likely to be helpful and complications few. But it would be a dangerous thing if doctors who had little familiarity with diathermy were to start making an extensive use of this treatment. Unfortunately it is a very difficult matter to arrange any form of thermometer whereby the exact degree of heat being produced in the tissues is at once conveyed objectively to the doctor administering the treatment. Until such a thermometer has been devised I can only warn others that diathermy, more particularly as applied to the urethra, may be a very dangerous form of treatment. If a burn is produced in the cervix no harm may follow, but if it is produced in the urethra a very severe form of stricture may ensue, which is far worse than the disease for which the treatment is being carried out. Diathermy can never, and should never, in our opinion, become a routine treatment for gonorrhoea in women,

[1] *Brit. Med. Journal*, July 14, 1923, p. 54.
[2] *The Lancet*, September 29, 1923, p. 652.

particularly as it is never likely to be within the province of the general practitioner to apply it.

The majority of cases of this disease will have to be treated in the near future by the general practitioner. The main object of this book is to describe simple methods within his scope whereby he can cure the majority of his cases. I sound a note of warning, then, and advise that diathermy treatment be reserved for cases that resist such simple methods of treatment, and that these cases should be referred to those who have experience of diathermy.

4. *Linear cauterization of the cervical canal* (Hunner's method). —The canal is anaesthetized with 5 per cent. novocain, and the cervix is then seized and held by a volsellum. The canal is cauterized to a depth of 2 to 5 millimetres, so as to produce a line of radiating scars from within outwards. The process is repeated at fortnightly intervals.

5. *Amputation of the cervix* has been advised if all other measures fail to rid the cervix of gonococci.[1] We have not had to employ this at the clinic, but had to adopt it in one private case with immediate cure.

It is hardly necessary to add that treatment applied to the cervix must be discontinued during the menstrual period, and the patient should be urged to rest in bed at this time. Urethral treatment should be continued, however, despite menstruation.

Pregnancy does not preclude cervical treatment, in fact it makes it all the more urgent. Cure of the cervix can be obtained during pregnancy, and will prevent subsequent tubal infection. We treated twenty-one pregnant cases, and all were cured before parturition. There is very little risk of producing abortion by this treatment, as in only one of our cases, or 5 per cent., did this happen. Anyhow, it is better to risk abortion and to cure the cervix, rather than to fear abortion and leave the cervix alone, when ascent to uterus and tubes and consequent sterility are almost bound to occur, and there is the risk of ophthalmia in the offspring.

Note on Anosol

Recently we have employed, at the suggestion of Dr. Henry Semon, instead of flavine 2 per cent. an antiseptic called anosol,

[1] Matthews, *Surg. Gyn. Obst.*, March 1921.

manufactured by the Mond Gas Company, Dudley Port, Tipton. The disadvantage of flavine is that it stains everything in its neighbourhood, yet we had not been able to find a non-staining drug that would give anything resembling the deeply penetrating and powerful antiseptic action of flavine, with its comparative innocuousness to the tissues. We believe we have found such an antiseptic in anosol, which does not stain, is non-corrosive, and yet cleans up the infected parts even more quickly than flavine. We use it in a 10 per cent. solution in water, and employ it exactly as described above for flavine. Particularly has it proved effective in children. In some cases lately in children we have obtained cures after four applications of anosol.

The Method of Dr. Remington Hobbs

Dr. Remington Hobbs described in the *Practitioner*, January 1921, a method of washing out the uterus. Dr. Simpson visited Dr. Hobbs at the Kensington Infirmary, and he very kindly demonstrated his method, for which we here convey our thanks. Dr. Simpson has since employed the method with success. It is as follows:

The patient must be admitted to a ward and prepared for two days. The vulva and vagina are cleaned up with ether soap, a drachm to the pint of warm water, douched with salt solution, a drachm of salt to the pint of water, and then swabbed out with equal parts of glycerine and iodine. On the second morning a general anaesthetic is administered, the patient placed in the high lithotomy position, and Auvard's weighted trough speculum or Sims' speculum applied to the posterior wall of the vagina. An anterior retractor is then placed and held up by an assistant. Using Dr. Hobbs' special catheter introducer, introduce a No. 5, 6, or 7 English soft rubber catheter with a lateral eye, lubricated with lubafax. Pass the catheter straight up through the internal os, which, if narrowed, should be dilated up to No. 7 Hegar until the eye of the catheter lies well inside the cavity of the uterus itself. Attach to the catheter a 10 c.c. record syringe and inject into the uterus 10 c.c. of antiseptic fluid. Any excess flows out around the catheter. Dr. Hobbs uses an aqueous solution of iodine (1 part in 10), 1 part;

glycerine, 7 parts. Suck out any excess of fluid with the syringe so as to leave the uterus empty and avoid painful uterine contractions. Leave the catheter *in situ* for six hours. One such treatment in a rebellious case is usually sufficient to effect a quick cure. If necessary the treatment can be repeated, but it is not usually necessary.

We do not recommend a routine use of this method. We reserve it for the following types, and never employ it unless we can admit the patient to a ward:

1. *Cases of acute or subacute endometritis and salpingitis*, with fever and tender uterus and a swelling of one or both tubes. In such cases after one treatment the fever drops at once, the case takes on a favourable course, and the swellings disappear.

2. *Cases of resistant chronic cervicitis, in which tubal infection is suspected.* Such cases react most favourably to the treatment.

A case illustrating the value of this method is given:

E. S., aged 27, single.

March 1922.—London Hospital. *History.*—Three weeks vaginal discharge; four days abdominal pain; pyrexia; 102° Fahr.

Examination.—Abdomen: tenderness and rigidity in left iliac fossa. (Gon.+) —acute urethritis. (Gon. +)—acute cervicitis. P.V.: tender uterus; tender lump in region of left tube, size of tangerine orange.

Bed; hot vaginal douches; hot applications to abdomen for two days; then uterus washed out with 10 c.c. of aqueous solution of iodine (1/10), 1 part; glycerine, 7 parts (one wash).

In one week tenderness and resistance nil; cervical discharge nil.

Examined in one month: Cervical gon. — ; urethral gon. + ; nil felt in pelvis.

Examination one month later: cervical gon. — ; urethral gon. +.

Urethritis persisted, but was cured in December 1922 with removal of urethral polyp.

She has been examined at regular intervals since up to October 1923. Cervix, no discharge, gon. — ; urethra, no discharge, gon. — ; nil felt in pelvis.

CHAPTER VI

ENDOMETRITIS, SALPINGITIS, OÖPHORITIS, PELVIC CELLULITIS, AND PERITONITIS

ENDOMETRITIS

Endometritis is a much-abused term. Recently certain investigators have taken scrapings of the uterus at definite periods both between and during menstruation, notably Opitz, Adler, Norris, and Cullen, and have shown that the endometrium undergoes a constant cyclic change, corresponding to the monthly cycle, and that most of the changes, previously described as 'endometritis', are merely different phases of the normal appearances of the uterine mucous membrane.

Actual inflammatory change in the endometrium is nearly always accompanied by similar change in the metrium or body of the uterus, which therefore becomes swollen and tender. Such inflammatory change is transient, because the uterus is able to shed its mucous membrane every month, and therefore readily purges itself of uncleanness.

When true inflammation of the endometrium is present, it is seldom caused by any but two classes of bacteria, namely, the gonococcus, 75 per cent., and the streptococcus, 15 per cent.[1] The tubercle bacillus was responsible for another 5 per cent., and the colon bacillus was found in a few cases associated with ovarian abscess.

The gonococcus ascends to the endometrium and body of uterus with difficulty and only exceptionally, under the conditions of childbirth or abortion. Provided that pregnancy is not interrupted, and provided that a gonococcal cervicitis is treated and cured before parturition takes place, it is possible to ensure that uterine infection shall not take place (see p. 67). Owing to the increased blood-supply of the parts, gonorrhoea tends to luxuriate during the puerperium. The condition known as granular vaginitis is seen, and condylomata acuminata take on an active growth. For instance, we treated twenty-one cases of gonococcal cervicitis in pregnant women. All were cured before parturition, and only one aborted (5 per cent.).

[1] Curtis, *Surgery, Gynaecology, and Obstetrics*, December 1921, p. 621.

A streptococcus (haemolytic or non-haemolytic) reaches the body of the uterus if abortion has been attempted, or if the cervix has been dilated and the uterus scraped, or after an unclean confinement. Many a sterile uterus has been scraped, and in a few days has become infected with a multitude of streptococci, which ascend to the tubes and cause peritonitis or pelvic cellulitis, or abscess of the ovary.

Even if gonococcal metritis does occur, it appears to be of short duration, and tends to natural resolution and cure, unless at the same time the tubes and ovaries have become infected. If this has occurred, then it is probable that the uterine body is constantly reinfected by bacteria descending from above. As a corollary, when infected tubes and a swollen uterus are found at operation it is only necessary to remove the infected tube or tubes to ensure that the inflamed uterus shall return to normal. There is no need to remove the uterus. Nevertheless, if both tubes have to be removed, the uterus is a useless and dangerous organ, and it may then be considered wiser to remove it at the same time, complete with the cervix, leaving behind one or both ovaries, or portions of the same if it is possible to do so without injuring their blood-supply, for the sake of their internal secretion. It is for these reasons that intra-uterine manipulations are seldom necessary for the treatment of gonococcal metritis. Metritis is often diagnosed when only cervicitis is present.

On the other hand, it may turn out that intra-uterine injections can be persuaded to enter the tubes and lead to the cure of the tubes. If this is so, such treatment might be permissible in tubal cases, but not necessarily for pure uterine cases, if such occur. (See p. 80, Dr. Hobbs' treatment.)

Even when ascent to the tubes occurs, we have found that in at least half the cases the tubes sterilize themselves by natural resolution, so that salpingitis does not by any means entail an operation. Operation should be reserved for chronic relapsing salpingitis, where resolution by natural process refuses to take place, and after Dr. Hobbs' treatment has been tried and has failed.

Symptoms and Signs.—Acute gonococcal endometritis and salpingitis seldom occur except after parturition or miscarriage, though occasionally they may follow the onset of menstruation

in a person, the victim of acute gonococcal cervicitis, who refuses to go to bed for a few days. When they do occur they make known their presence by producing definite well-marked constitutional signs, which are absent in simple cervicitis.

The onset may be ushered in by a rigor, which is followed by a period of fever lasting a week or ten days, the temperature averaging 102° to 103° Fahr. There may be malaise, nausea, and vomiting, and the patient complains of a dull aching pain in the back of the sacrum or over the pubes, and of rectal tenesmus. The vaginal discharge increases, but becomes thinner and less tenacious, and may be blood-stained. If the doctor is already aware that the patient has a gonococcal cervicitis, these symptoms should suggest the onset of endometritis. Vaginal examination reveals a large tender uterus. The gonococcus having already been recognized in the cervix and urethra, there is no need to take intra-uterine swabs, a process advised as a routine in cases of gonorrhoea in one of the Medical Research publications (*Reports upon Pathological Methods*, 'The Laboratory Diagnosis of Gonococcal Infections'). This and other clinical errors have since been eliminated from the report in the edition of 1923 revised by Dr. Western. Dr. Western has been able to eliminate these errors owing to the practical knowledge he has gained in our department.

The diagnosis of metritis is not difficult if the above remarks are kept in mind. Gonococcal metritis, however, has to be distinguished from streptococcal metritis. In the latter there is no history of venereal infection, but a history of interference with the uterus by abortion, curettage, or parturition. The symptoms and signs are far more severe, and films and cultures taken from the cervix reveal a streptococcus in pure culture. The treatment should be expectant. Suspend all cervical treatment, confine the patient to bed in the Fowler position, and apply warm fomentations to the abdomen. In the absence of a tubal infection the metritis may clear up of itself.

Chronic Endometritis

This may follow an acute attack or come on insidiously without an acute stage. It is seldom present except in conjunction with infected tubes. The chief symptoms are persistent leucor-

rhoea which fails to react to cervical treatment, accompanied by a chronic aching pain behind the sacrum.

Points in diagnosis from simple cervicitis are that in metritis the vaginal discharge is thin and profuse, menstrual disturbances are present such as dysmenorrhoea or menorrhagia, there is persistent pain in the back, and examination may reveal a large and tender uterus, and also an enlarged tube or a pelvic cellulitis. It is doubtful if curettage can effect a cure of chronic gonococcal endometritis, and curettage may even make matters worse. Rather than curettage Dr. Hobbs' treatment should be tried (see p. 80). If metritis persists, it usually means that an operation on the tubes is desirable. After the removal of the infected tube the metritis will cease of itself. If both tubes are infected, the uterus will need removal.

SALPINGITIS AND OÖPHORITIS

When we started our clinic we had a vivid expectation that in most of our cases the gonococcus would spread to the tubes, from which we should find it difficult if not impossible to dislodge it, and that we should therefore find the disease incurable and all its victims sterile. This was implanted in our minds by the frequency of operations for pyosalpinx and hydrosalpinx in the gynaecological wards, and by the statements of the propagandists and birth-rate agitators. To our surprise, and greatly to our satisfaction, as the work proceeded we found that infection of the tubes and uterus was a most exceptional occurrence. In the first few years we only met with eleven instances in 223 gonococcal cases, or less than 5 per cent. When we began to ask ourselves why this should be, we realized that it was because we treated our cases vigorously and regularly, and cured them reasonably quickly; and that even when the patients were pregnant we cured them before parturition could occur, and so prevented salpingitis. We came to the conclusion that if gonorrhoea in the female can be seen early and treated early and quickly, as can be done, then the dreaded complication of salpingitis will not occur. In other words, the large number of pyosalpinxes operated on in the gynaecological clinics of London to-day are the reflexes of the failure of gynaecologists to insist on treating gonorrhoea in females early and systematically. Infected tubes are not an inherent danger of gonorrhoea,

they are a natural consequence of the neglect of gonorrhoea by the medical profession and the examiners.

Our experience of gonorrhoea of the upper genital tract has not been extensive, as so few of our cases have developed the disease in this extreme form. Where salpingitis has been encountered, we have found that in half the cases it subsided naturally and led to no further trouble. But when the gonorrhoea has persisted in spite of careful and prolonged treatment we have come to the conclusion that we are dealing with a constant reinfection from above as a result of a chronic salpingitis. One of us (F. K.) has then performed abdominal section on these cases, and has found one or both tubes inflamed and dilated and the body of the uterus enlarged. Where one tube has appeared healthy we have left that behind and have removed the ovary and tube on the affected side and the cases got well. When both tubes were affected we have removed both tubes and uterus, leaving behind as much ovarian substance as possible.

We have found most help in our work from the writings of Curtis [1] and Clark and Norris,[2] and we freely acknowledge our indebtedness for what follows to these authors, whose conclusions are so important and helpful that we need make no apology for repeating them fully here.

If the disease spreads upwards, as is only likely to happen after parturition or miscarriage, it seldom attacks the uterus alone but spreads to one or both tubes. In a majority of cases it only spreads at first to one tube. If neglected, it spreads to both tubes eventually, another argument for early treatment.

The infected tube swells up from inflammation, and some of its contents escaping into the peritoneum, adhesions of a soft, easily separable, fibrinous type are formed. These usually occlude the abdominal ostium. Sometimes the gonococci spread to the ovary and infect one or more of its cysts, with the formation of abscesses of the ovary. Nevertheless, this is uncommon as compared with streptococcal cases. More commonly the uterine end of the tube becomes sealed up so that a pyosalpinx or a hydrosalpinx is formed. As these enlarge, they break through into the uterus, and from time to time discharge some of their contents and so continually reinfect it.

[1] *Surg. Gyn. Obst.*, December 1921, p. 621. [2] Ibid., April 1922, p. 509.

According to Curtis, it is impossible to isolate gonococci from diseased tubes that are obviously gonococcal in origin from clinical evidence more than a fortnight after all cessation of fever and leucocytosis. He argues from this that constant intermittent reinfection of the uterus from above does not occur. Nevertheless, because he cannot grow the gonococcus from these tubes it does not necessarily follow that they are, when in the body, gonococcus-free. Clinical evidence suggests that they are not all so, as we find it impossible to cure certain tubal cases without removing the tubes. Removal of the tubes cures even those cases whose tubes did not reveal gonococci after removal. A permissible assumption is that cultural methods when applied to the gonococcus are not yet sufficiently exact.

Though peritonitis at its first onslaught is often fairly severe, yet it is hardly ever a diffuse universal peritonitis. It remains strictly localized to the pelvic regions, and in the course of a week or ten days subsides, whereupon the alarming symptoms disappear. Eventually the fibrinous adhesions are replaced by fibrous adhesions, which may give rise to secondary effects, such as chronic or acute intestinal obstruction, long after the gonorrhoea has been cured.

Curtis found that though 70 to 80 per cent. of his cases of tubal infection were undoubtedly gonococcal, yet in only 15 per cent. could he demonstrate the continued presence of the gonococcus at an operation on the tube, using the most exact methods. He assumes that the gonococcus tends to die out in a few weeks after it has reached the tube—that is to say, when it has become encapsulated. The same result of encapsulation has been noted by us in the case of Bartholin abscesses (see p. 43). Another assumption is possible, namely, that all methods of growing gonococci outside the body on artificial media are imperfect.

Clark and Norris found that tubal inflammation was caused, in 95 per cent. of their cases studied, by three types of bacteria:

1. The gonococcus.
2. The streptococcus (haemolytic and non-haemolytic).
3. The tubercle bacillus.

Other bacteria were occasionally responsible, such as the

colon bacillus and the staphylococcus. These results agree closely with the independent observations of Curtis.

The differential diagnosis can be made if regard be had to the various points made out by these authors.

1. **Gonococcal Inflammation.**—It is known by previous examinations of the lower tract that the patient has had gonorrhoea. Tubal extension seldom occurs except after parturition or a miscarriage or menstruation in the early acute stages. The attack is of moderate severity with a temperature of 100° to 103° Fahr., and the patient does not seem dangerously ill. The local signs of inflammation are not very severe, and the swelling of the organs is not great or rapid. A sausage-shaped tumour is felt in the region of one tube, and there is no pelvic cellulitis. The acute stage lasts a week or ten days, and then may clear up altogether or give way to a period of chronic ill-health. At the first attack the disease is generally unilateral. In many cases the disease yields quickly to expectant treatment. If the attacks are repeated, the disease eventually spreads to both tubes.

2. **Streptococcal Inflammation.**—There has been no history to lead to a suspicion of gonorrhoea, and if any examination has been made, gonococci will not have been demonstrated. The history is one of an attempt at abortion, or a curettage of the uterus, or a septic confinement. The onset is rapid and extremely severe. No cases of bacterial peritonitis seem more severe or urgent at the onset than these; the temperature is very high, 105° to 108° Fahr., the pulse weak and rapid, and the patient looks very ill, as if severely poisoned, pale and slightly cyanotic. Even so, it is extraordinary how quickly the signs will sometimes ameliorate after a short period of expectant treatment.

On examination, pelvic cellulitis is often present, as well as pelvic peritonitis and perhaps an abscess of the ovary. There is often a foul uterine discharge, which on culture grows a streptococcus. Blood cultures should always be made, and are often positive, though only temporarily so. Leucocytosis suggests a mild infection and a good prognosis, leucopenia the reverse. Injections of anti-streptococcal serum should be given, and an autogenous vaccine should be prepared by rapid methods and exhibited without delay. The abdomen may be rigid and tender, not only in its lower part, but universally. The mortality

is high, as high as 10 or 15 per cent., but if recovery ensues there are usually no recurrences.

Expectant treatment aided by autogenous vaccines and sera seems to hold out the best hope of cure, but it is sometimes necessary to wash out the uterus after the method of Dr. Hobbs, or to curette the uterus and swab it out with iodized phenol, after cultures of its contents have been made. It may be necessary in certain cases to carry out an abdominal exploration for abscess of the ovary or removal of an infected tube. If such an operation is carried out, it is wiser to remove the tube than to drain it. Drainage may lead to intractable fistula and secondary operations.

Tuberculous Salpingitis

The patient is of tender age, and has not had sexual connexion. There is evidence of tuberculosis in other parts of the body. There has been no history of uterine interference. The disease may come on insidiously with very slight fever, or it may follow an attack of diffuse ascitic tuberculous peritonitis, accompanied by general wasting and anaemia. The disease is nearly always bilateral and runs a chronic course. The swellings felt are tubal enlargements. It is seldom possible to demonstrate tubercle bacilli in the secretions obtained from the cervix, but the diagnosis can usually be made by the exclusion of the gonococcus and the streptococcus, by the history and youth of the patient, and by the presence of tuberculosis elsewhere in the body.

Treatment of Salpingitis.—It is unwise to be in a hurry to operate during the acute stages of pelvic inflammatory diseases. This is in contra-distinction to the modern teaching on appendicitis and other acute abdominal emergencies. All the same, when a young woman is brought into hospital late at night with obvious signs of acute peritonitis, and pain and swelling are encountered in the right iliac fossa and right side of the pelvis, then it is often necessary to explore, as it is in the highest degree unwise to 'cook' an acute appendix under a mistaken idea that it is caused by an acute salpingitis. If it turns out on exploration to be a case of acute salpingitis no harm need ensue if the tube is at once removed. If, on the other hand, no exploration is carried out and the case is in reality

one of acute appendicitis, the patient may lose her life. My rule, then, is to explore at once, unless I can be absolutely certain from the history and from previous knowledge of the case that I am dealing with an acute salpingitis.

In doubtful cases I incise just to the right side of the middle line, and turn the right rectus outwards. This gives an admirable exposure through which it is possible to deal satisfactorily with whichever is found, inflamed appendix or inflamed tube. If an ordinary appendix incision has been made and an inflamed tube is found, then it may be better to make a fresh incision as described above, and stitch the first incision up completely. I have usually found under these circumstances that I have had only one inflamed tube to deal with, the body of the uterus being swollen and the other tube healthy. In those conditions I have contented myself with removing the infected tube, and the results have been satisfactory. The uterus settles down, and subsequent cervical treatment cures the gonorrhoea. I leave the ovary unless it contains an abscess, and I do not drain the peritoneum at all, unless there is a large peritoneal abscess cavity present at the time of operation. It is comparatively easy to peel the tube out of its delicate fibrinous adhesions during an acute attack.

In making a diagnosis in a case of 'acute abdomen' I use the following table, which I have worked out as a result of experience. Using this table I have found it possible in a large number of 'acute abdomens' to make an accurate diagnosis of the cause before operating, by spending a few minutes after examining the case, sitting down and thinking the diagnosis carefully out. By making an accurate diagnosis before opening the abdomen it is possible to plan a suitable incision for each case and so to improve the operative results.

Table of Acute Abdominal Emergencies

1. *Colics.*—Intestinal, appendicular, renal, biliary.
2. *Peritonitis.*—Bacterial infection from a viscus, appendix, tube, intestine, stomach, gall-bladder.
3. *Pyelitis.*—Bacterial invasion of the kidney.
4. *Peritoneal shock.*—Collapse from rupture of a viscus, stomach, gall-bladder, appendix, tube.
5. *Acute intestinal obstruction.*

6. *Twists.*—Ovary, fibroid, bowel.
7. *Haemorrhages.*—Ruptured ectopic pregnancy, pancreatitis, omental vessel.
8. *Embolus and infarct.*
9. *Extra-abdominal causes.*—Pneumonia and pleurisy, tabetic crises, spinal disease.
10. *Uraemia.*—Ileus and vomiting with subnormal temperature.

In cases where there can be no reasonable doubt as to a diagnosis of acute salpingitis, expectant treatment should be employed. The patient is put to bed in the Fowler position and an hourly chart is started. For many years I have found an hourly chart of the pulse, respiration rate, and temperature of inestimable value in cases of 'acute abdomen'. In the course of six hours it is usually quite clearly shown by the chart whether improvement is setting in, or whether the disease is progressing and should be cut short by operation.

Apply heat in some form or other to the lower abdomen, hot-water bags, hot fomentations, linseed poultices, or electric pads, whichever are to hand. If the patient is in hospital and can be treated by a trained nurse, then it is advisable to give hot saline douches as hot as can be borne, twice a day, employing 4 pints or more at each sitting. If the patient is at home without trained assistance, hot douches should not be employed. The patient should receive plenty of nourishment, in the liquid form at first, but as soon as the tongue cleans a little, and the appetite returns, solid food should be given, in spite of moderate fever. *The bowels must be regulated, but it is in the highest degree undesirable to give rectal enemata or any rectal treatment for fear of infecting the rectum with the gonococcus.* Under these measures an acute attack of salpingitis will usually subside in ten days to three weeks, and it appears that if treatment is then applied to the cure of the cervix and urethra, more than half of these cases may resolve entirely and get well without operation. We have been accustomed to wait and see the result of such treatment. Latterly we have applied Dr. Hobbs' method of intrauterine lavage with success. If, however, there are repeated attacks of acute or subacute salpingitis, and the cervix will not become gonococcus-free because of this, then we are accustomed

to operate. It is better not to wait too long until the adhesions have become dense, secondary adhesions to the bowel and bladder troublesome, and the other tube infected.

The right rectus muscle is turned outwards, with the patient in the high Trendelenburg position. All adhesions are carefully dealt with, using as much as possible a sharp knife, cutting with this along the natural bloodless lines. I prefer this to brushing with gauze or gloved fingers, as is so often described. By using a knife in a good light I find that the intestines separate out quite cleanly, do not bleed, are covered with smooth tissue, and there is less likelihood of the adhesions re-forming. In this connexion it is important to use swabs and sponges wrung out of warm physiological salt solution and not out of strong antiseptics. When the intestines have thus been separated and the appendix removed, the intestines are allowed to drop up out of sight, and a smooth pack delicately inserted to keep them out of the way. The tubes are explored, separated from their pathological connexions, again using a sharp knife, and being in no hurry to cut till the structure to be cut is clearly defined and seen.

In favourable cases one tube alone is infected. In such a case the tube can be removed and the ovary left behind. If, however, the ovary contains abscesses it should be removed as well. If both tubes are obviously infected, it is unlikely they will ever be patent again. The question then arises as to whether any object is gained by leaving behind the uterus. After both tubes have been removed it is a useless organ, and as it is liable to cancer, fibroids, and other troubles its removal *in toto* with the cervix would appear the wisest course. Wherever possible one ovary should be left behind if this appears to contain no pus, and if its blood-supplies can be preserved so as to maintain its internal secretion. Even if the blood-supply of the ovary is largely cut off, yet the ovary seems to be able to obtain a new blood-supply and live on in the peritoneum.

Salpingostomy appears to be ineffective, and may lead to dangerous complications, such as vesical, vaginal, and rectal fistula.

Summary

We have learnt from our clinical study that the risk of tubal infection is largely a bugbear, brought into being by the lack of early and organized treatment of female gonorrhoea. Once

it is possible to see these cases early, treat them early, and cure them quickly, tubal infections seldom occur. This result may be said to justify, more than any other single point, the setting up of special venereal clinics.

Till the general practitioner trains himself to treat gonorrhoea in its early stages in the female, as he can learn to do by attending the clinics, I do not see how it is possible to deal with the disease on a large scale except by the organization of such clinics. Eventually these clinics should justify their existence by teaching and training the general practitioner, when fewer of them will be needed. Till that object is attained they ought to go on with the good work, in spite of the fulminations of some of the correspondents in the lay press, who, it is quite clear, do not understand the educative work these clinics are doing. It is no use shouting 'away with these clinics' until the general practitioner has learnt to deal with gonorrhoea in the female in an adequate manner. And I think that there are few general practitioners who would at present acknowledge in their heart of hearts that they had received any adequate training in this disease when they were becoming qualified at their hospitals, or that they had been tested on the subject, from the examination point of view. Examiners take little interest in gonorrhoea.

If salpingitis takes place and the disease fails to react to the cervical and intra-uterine treatment, then an operation is likely to be required, one that needs a highly trained surgical judgement. When the practitioners are trained to deal with gonorrhoea in the female such operations should become less common than they are at the present day.

CHAPTER VII

GONORRHOEA IN FEMALE CHILDREN

Our experience at the clinic has opened our eyes to the prevalence of gonorrhoea in female children. No less than fifty infected children were met with in 650 cases—that is to say, at the clinic one case in thirteen is a child, or roughly, 8 per cent. Most of the children were under eight years of age, whereas on the male side of the clinic we rarely see gonorrhoea in boys below the age of twelve, and then usually as a result of sexual precocity. On the female side we often have to treat vulvitis in the majority of the female members of a family. In some instances we have had to cure the father, or the mother, and several of the female children before we could root out the gonococcus from the infected home.

To determine the real source of infection in female children is a problem of extreme difficulty. Because of the rarity of the disease in male children we are inclined to believe that vulvitis in the female child is usually contracted innocently and from external objects. Nevertheless, we are aware that a deeply rooted tradition is prevalent amongst the lower classes that contact with a virgin will lead to a cure of chronic gonorrhoea. Two of these fifty cases were, undoubtedly, the result of rape attempted by infected males possessed with such mistaken beliefs. But seeing the extreme youth of some of the cases, and considering the fact that whole families are often infected, and knowing that vulvitis can spread through a children's ward, we are inclined to think that such cases are in a minority, though American authorities state that rape by adults is a common cause. Out of fifty cases in female children, in only two was there a history of rape. One of these had acquired syphilis as well as gonorrhoea.

No task is harder than to root out a baseless superstition from amongst the common herd of mankind. Such superstitions can hardly be fought by the powers of reason, but they can be replaced by other and better superstitions, or by the emotional appeals and the sublimations of religion and faith. It is possible that some day the herd will learn to use its powers of reasoning and to face reality, but at present it is chiefly

swayed by the powers of imitation, suggestion, sympathy, feeling, and tradition.

It has been stated that the vulva may become infected at childbirth while the child is passing through infected maternal passages, just as the eyes can be. If this were so it would be advisable to sponge over the vulva with silver nitrate solution, just as the eyes are washed out with it as a matter of routine at birth. We could find no evidence to support this hypothesis.

Probably the majority of these infections arise from the promiscuous life of the poor. We have seen with our own eyes in the East End of London all the children sleeping in one bed with the father and mother, and know that they often use common towels, sponges, soap, toilet utensils, and lavatory seats. From the fact that we have treated a number of families, we believe this promiscuity is the common cause of infection. The use in common of the towel, soap, and sponge are, in our opinion, the main source of the trouble. There seems to be no doubt that infection can get into a school, or even into a ward in an institution, and that it can spread rapidly and widely. Quite how, we do not know. Presumably by water-closets, towels, baths, sponges, soap, or even thermometers and syringes.

The disease is also encountered in children of the well-to-do classes. Here it is usually met with sporadically and not in epidemics, and is probably due to tricks played on the sexual organs by amorous governesses or servants.

The vulval secretions of the child appear to be lacking in those bactericidal qualities which characterize the vaginal secretion of adults. This may account for the susceptibility of children to infection from external objects.

Pathology

The mucous membrane of the youthful vagina is said not to harbour Döderlein's bacillus, and is said not to secrete a bactericidal fluid. However that may be, the gonococcus appears to find its most ideal medium in the mucous membrane of the infant vulva. In certain cases the mucous membrane appears healthy, the secretion is not purulent, films are negative, yet cultures continue to yield the gonococcus for many months.

Spread to the cervix is said to be rare, but we have found definite evidence in a few chronic cases that the external os needs treatment before the disease will clear up.

Urethritis is less common than in adults. Norris states that it occurs in 20 per cent. of the cases. In our cases it occurred in 10 per cent. We have been led with increasing experience to treat the urethra as a matter of routine.

Other complications are rare. Two cases, or 4 per cent., had arthritis; one case, or 2 per cent., had ophthalmia; otherwise there were no complications.

Peritonitis is almost unknown. We have seen subacute pneumococcal peritonitis with a large collection of pus in the pelvis and lower abdomen in a few instances in children, as a result of pneumococcal vaginitis. Acute diffuse pneumococcal peritonitis presents a different picture, occurs as a part of a generalized pneumococcal infection, and is seldom met with in children.

Symptoms of Vulvitis

In acute cases the symptoms are a severe pain between the legs increased by walking, burning and increased frequency of micturition, and a vulval discharge. In chronic cases, especially in non-specific cases, the child may complain of nothing more than a slight itching which causes her always to be scratching the parts, a factor which sets up secondary excoriations and infections of the skin around.

Physical Signs

When examining a child it is advisable to wear motor goggles (just as in urethroscopy) in case the child starts passing water into your face, as is the way of a child. Examination is often a difficult matter. The child may kick and scream, so that patience and tact are required. If the child's confidence can be won, so that she will keep quiet, a cure is more readily and quickly accomplished. If the child refuses, there is nothing for it but to hold her down while examination and treatment are carried out. The child must lie on her back with legs held widely apart and flexed on the abdomen. A nurse stands on each side holding an arm and a leg. A thick, yellowish discharge is seen covering the labia, which are swollen and tender and glued together, and when separated reveal the vestibule and

hymen, which are red and oedematous. Excoriations covered with crusts are often present on the skin of the perineum and thighs, which crusts, on being removed, leave bleeding surfaces. These are pus infections caused by scratching. In old-standing chronic cases small superficial ulcers may be seen on the inner surface of the labia, and even condylomata acuminata. In acute cases there may be slight fever, especially if there is enlargement or suppuration of the inguinal glands.

Diagnosis

The diagnosis of gonococcal vulvo-vaginitis in children is made by finding gonococci in films of the vulvo-vaginal discharge. *In this manner the diagnosis differs in toto from that in adults.* In adults it is a waste of time to seek the gonococcus in vulval or vaginal discharge. In children it is the only place in which the gonococcus is likely to be found, and its recognition in fresh or acute cases is seldom difficult. All vaginal diseases in children, however slight, should be strongly suspected of a gonococcal origin, and should not be rejected as such until at least three or four careful film and cultural examinations have been made at several days' interval.

Our experience has also taught us that even in acute cases treated from the start, and also in chronic cases treated late, a stage may ensue where all signs of inflammation or purulent discharge are absent, yet gonococci can still be recovered by culture from the vulval walls. These cases appear to be true 'carriers' in the strict sense of the word, and probably account for school epidemics.

Vulvitis can arise from other causes, particularly uncleanliness and parasites, and also from malnutrition, acute specific fevers, thread-worms and other foreign bodies, and from bacteria such as the pneumococcus, colon bacillus, tubercle bacillus, and the bacillus of diphtheria. Twenty-four cases of non-specific vulvitis were seen. In sixteen of these the cause was uncleanliness and parasites. This leads to scratching, which, in turn, produces excoriations and streptococcal impetigo. This is accompanied by eczema or dermatitis on the inner sides of the thighs and enlarged inguinal glands. Such an appearance suggests strongly a non-specific vulvitis. Two cases were tuberculous, and two due to trauma.

Complications

Urethritis is the only common complication (10 per cent.).

Inguinal adenitis may occur in non-specific cases, but seldom goes on to suppuration. We have seen warts in neglected cases of long standing, and in five cases we have seen cervicitis.

Ophthalmia has been a rare complication at our clinic (2 per cent.).

I often think that the risk of ophthalmia by hand infection has been greatly exaggerated. The commonest cause of ophthalmia is childbirth. We very seldom see either adults or children coming up to the clinic with gonorrhoea of the genitals and subsequently developing ophthalmia. Yet it is impossible to warn young children of the risk to the eyes. Hence I believe the risk to be slight, yet it is one of which adults should always be warned. Many eye infections that appear at first sight to be gonococcal conjunctivitis turn out to be iritis or irido-cyclitis arising from a blood infection. We saw two cases of arthritis in children. Both had a specific vulvitis. One had also an ophthalmia; in the latter case all manifestations of the disease cleared up in three weeks as a result of local treatment applied to the vulva and eye. The former failed to attend for treatment. Arthritis is just about half as common as a complication, as compared with adult cases.

Proctitis is said to be a common complication in America. We saw no instance of it.

Treatment

No disease can more severely tax the patience of doctor or nurse than vulvo-vaginitis in children. Yet with perseverance there are few cases that will not finally yield to treatment based on experience. *In the first place, a determined effort must be made to examine all the other members of the family.* I can see a smile of superiority spreading over the face of the old-fashioned practitioner as he reads this statement. Such supercilious smiles are the refuge of the indolent. The proof that this can be done if only one is in earnest is that we have actually in a number of cases persuaded the whole family, father, mother, and children, to come up for examination and treatment. When it is put to them in a suitable and kindly manner they are quite willing to come up to be examined. In this way we have been able

to clear all the infected members of a family of gonococcal infection and to purify the home. It is useless to treat one member of the family if she or he is to go back to reinfection at home.

When treating a woman we usually manage to get the husband to come up also to be examined and, if necessary, treated. Unless you try to do this you are not doing your job. I appeal to the younger members of the profession to enlarge their outlook in this direction, and not to keep their eyes focused on the individual alone. Here the human group or family needs investigation and treatment, not the mere isolated individual. In any case, the mother must be warned to provide the child with its own marked towel, soap, sponge, and basin and chamber, to see that the water-closet is wiped over with lysol (a drachm to the pint) after the child has used it, and if possible to give the child a separate bed. Unless this is done, the disease will spread to other members of the family. She is told to bring up the child at once if the eyes become inflamed.

The routine treatment we have found effective in the majority of cases is as follows. With the parts fully exposed, dry out the vulva with mops of wool held on sponge-holders. Using wool twisted on to Playfair's probes, paint out with 2 per cent. acriflavine in salt solution all the surfaces of the labia, vestibule, hymen, and skin around the vulva. Pay particular attention to two natural folds which lie just outside and behind the hymen. After this has been done, dry out the vagina with wool on Playfair's probes passed through the hymen. It is of advantage as treatment proceeds gradually to dilate the hymen so as to permit of freer entrance for the probe and more adequate drying and mopping. Using 2 per cent. flavine in salt solution, syringe out the vagina with a pipette and rubber teat, and then paint over the whole of its surface with a wisp of cotton wool twisted on to a probe. At our clinic it has only been possible to carry out this treatment twice a week, and in the interval the mother has been instructed to bathe the parts with warm water and dry them. But in private patients or in cases where the mother is intelligent enough to be able to carry out treatment herself, it is of great advantage to carry out the treatment daily. We have obtained much quicker cures in private practice when applying daily treatment.

If treatment is carried out daily the flavine may prove too

irritating. In such cases we employ it twice or thrice a week, and on the other days we employ eucalyptus 10 per cent. in sterile olive oil, or 10 per cent. collosol silver. Usually after about six applications the discharge has diminished to a minimum quantity and all pain and itching have ceased. At the end of two to three months the vulva and vagina will appear quite healthy, and the patient will be cured. Recently we have employed anosol 10 per cent.

The average time of cure in all the cases was four months. This gives an exaggerated idea of the difficulties. The majority of the cases cleared up in three to five weeks, but the figures are weighted with a number of resistant cases that took many months to cure. Thirty-six out of the fifty cases attended regularly till passed as cured by full culture tests. Most of the others attended till they were apparent cures as regards film tests. In only one case did we fail to attain a cure. In a certain number of cases, though the patient appears perfectly healthy and there is no purulent discharge, yet undoubted gonococci can be demonstrated by culture as still present in the vulva. The patients have become gonococcus 'carriers'. The cure of this type of case is difficult, and treatment may have to be pursued for many months before it can be attained. One case has occurred at our clinic which has, so far, defied all our efforts, carried out for a year and a half, though we suspect reinfection.

In such cases we proceed as follows:

An anaesthetic is administered and a tiny Cusco's speculum carefully introduced so as to avoid rupture of the hymen and yet permit of exposure of the cervix. In a few of these cases we have found the external os to be red and swollen, and have demonstrated gonococci in the cervical secretion. To the external os we have applied a few drops of iodized phenol, or silver nitrate 20 grains to the ounce. This has been repeated weekly for some weeks and a cure has been effected. In others we have been unable to demonstrate any cervical infection, and the cause of the persistent carrying remains obscure. We are carrying out studies to elucidate this point. We imagine that the gonococci must live in some crypts which we have failed to ferret out. Eventually we have cured most of the carriers by sticking to the vaginal and vulval paintings for many months,

using silver nitrate 20 grains to the ounce, lactic acid 1 per cent. and other strong chemicals.

The method of Van Gieson (1910), quoted by Norris, may be used for these cases. By means of a medicine-dropper or all-rubber eye syringe, 3 to 4 drachms of a 1/4000 mercuric chloride solution made up in isotonic salt solution are introduced into the vagina and sucked in and out of the syringe several times. After this has been thoroughly carried out the washings are sucked up into the syringe and centrifugalized and examined for gonococci. The vagina is then dried out and painted out with silver nitrate, 5 to 10 per cent. solution in water.

Twenty-four hours later a second lot of washings is obtained and gonococci looked for. The silver nitrate acts as an irritant and the second washings are, therefore, more likely to contain gonococci. This method is used towards the end of a course of treatment, when it is desired to determine whether the case is cured or not. It is also a helpful method of treatment in resistant cases.

The favourable effect of daily treatment may be illustrated by the following case:

Miss ——, referred from South Africa, aged 2 years 4 months. Seen 11 September 1919, with a history of nine months' gonorrhoeal vaginal discharge contracted from native nurse. Syringed daily with potassium permanganate; purulent discharge still present.

We gave one paint acriflavine 2 per cent. in saline, and this was carried out daily (three weeks' treatment) till seen 27 October, when there were no clinical signs of vaginitis or vulvitis.

Bacteriological Examination.—Culture, *Staphylococcus albus*. Films, degenerative staphylococcus.

Urethritis

Urethritis was present as a complication in 10 per cent. of our cases. Probably in many cases urethritis is present, but clears up by natural resolution in the course of four to six weeks. If this does not happen we have been accustomed to pass into the urethra a tiny Playfair's probe covered with a wisp of cotton wool, dipped in silver nitrate solution, starting with 5 grains to the ounce and working up to 20 grains to the ounce. This has been done twice a week and has usually produced a cure after about eight applications.

We are now inclined to employ the treatment as a routine in addition to the vulval painting, and are of opinion that we thereby obtain quicker cures.

CHAPTER VIII

GONOCOCCAL ARTHRITIS IN WOMEN

Out of 223 adult gonococcal cases, fifteen, or 6½ per cent., presented joint lesions. This is roughly the same percentage as met with in male subjects. Five of these already had fibrous ankylosis in poor position when first seen, and in only one of these could we obtain a mobile joint. One failed to attend for many months after the first visit, and came up later with ankylosis. Six cases had early acute arthritis of various joints, most commonly the knee, the wrist, and the ankle, less commonly the elbow, shoulder, hip, fingers, and maxillary joints. In one case the sterno-clavicular joint was affected. All of these cleared up quickly in a few days to less than three weeks with perfect movement, as a result of daily vigorous treatment applied to the primary foci in the urethra or cervix, or both.

Joint cases should not be allowed to linger untreated in the medical wards. Directly a correct diagnosis has been made, cure can always be quickly attained with perfect movement, if proper treatment is at once instituted. There is no need for vaccines or drugs. Local applications to cervix and urethra, and active movements by the patients themselves quickly produce a cure. Would that this lesson could sink into the minds of the profession.

Three cases failed to attend after one visit and were lost sight of. Gonococci were present in both cervix and urethra in four cases. They were present in cervix, urethra, and Bartholin's gland in one case, in the cervix only in three cases, in the urethra only in three cases. Gonococci can, therefore, invade the blood-stream and attack the joints from either the cervix or urethra alone. In either case local treatment to urethra and cervix at once cuts short the trouble. No further gonococci are absorbed, and the arthritis melts away. In children gonococci can invade the blood-stream from the vulva.

The first case treated in the department had a specific urethritis with joint trouble. She had lain for three weeks in a medical ward treated with salicylates and stock vaccines without relief. In ten days, under local treatment, she was walking

about again. In no case treated did we fail to find immediate improvement once local treatment was started.

Nowadays all joint cases are at once admitted to our special beds, and we never have any cause for anxiety as regards ankylosis. One case with a terribly painful and stiff knee of three and a half months' duration was carried in unable to walk One treatment was applied to cervix and urethra, and three days later she walked into the department without any pain at all, though the stiffness remained for a short time.

Non-Gonococcal Arthritis

Six cases were sent to the department for us to determine the cause of the joint trouble, and that proved to be non-gonococcal, and not to take origin from the urogenital tract. These were either cases of 'osteo-arthritis' or tuberculosis.

Two more sent up for diagnosis were found to be caused by non-gonococcal cervicitis. In one case there was a *Bacillus coli* infection of the cervix accompanied by arthritis and irido-cyclitis, which cleared up on cervical treatment. A second had had pneumonia one year previously. She had a pure infection of the cervix with the pneumococcus, and gave the complement-fixation test to this germ. She had an acutely inflamed cervix discharging bright yellow pus. The cervix was treated as usual and promptly the arthritis disappeared. (We have seen cases of pneumococcal cervicitis in children accompanied by local pelvic purulent peritonitis containing the pneumococcus.)

Another case of joint trouble had negative cultures of the urethral and cervical secretions. Yet she had a thickened tender tube on one side. She refused treatment. Probably this was arthritis secondary to a gonococcal closed tube.

It is well to remember, therefore, that arthritis can arise as a result of a cervicitis or a urethritis. Usually the infecting germ will be the gonococcus, but it may be any other pathogenic bacterium, such as the *Bacillus coli*, pneumococcus, streptococcus, or even *Staphylococcus aureus*. We have seen one case of arthritis from the diphtheroid bacillus, which we usually consider as non-pathogenic. We consider the *Staphylococcus albus* to be non-pathogenic.

Our first patient treated at the clinic had arthritis, and the

painful joints subsided directly we started urethral lavage. Further experience has taught us these lessons:

1. That gonococcal arthritis in women appears to be of urethral or cervical origin, or both.

2. That if the urethritis and cervicitis are treated vigorously by urethral lavage and cervical paintings, the active joint trouble at once begins to resolve.

It is an unfortunate fact that many cases of gonococcal arthritis in women enter first the medical wards of a hospital labelled as 'acute rheumatism'. House-physicians need to be alert in examining these cases, as acute rheumatism is not common in adults. In all doubtful joint cases admitted to the ward they should at once take a platinum loop smear from the urethra and cervix, and get the woman to pass water into two glasses. Gonococci, if present, will be readily found in the smears, and the urine will contain pus. If the first smear is negative, but if pus is present in the urine, then they should make further and more exact observations to exclude the gonococcus. Urethral lavage and cervical painting can be carried out even in a medical ward, and should be started directly a correct diagnosis has been made. The house-physician should not wait to begin treatment until the patient can be moved to the venereal clinic. As beds are still grudged to the venereal clinic, some of these cases must continue to be treated in the medical wards.

Natural History

The gonococcus may attack any joint in the body, but characteristically it attacks the joints of the knee, ankle, wrist, elbow, and jaw. It may attack a single joint or any number of joints, either simultaneously or one after another.

In its mildest degree it causes pain and stiffness without actual swelling of the joints and without fever.

In its second degree it causes a comparatively painless effusion into a single joint, such as the knee or elbow, unattended by fever. The joint is movable, but the muscles around are wasted, so that the joint feels insecure when the victim attempts to walk about.

In its most common degree it leads to a rapid and painful effusion of fluid into a joint or joints, accompanied by consider-

able fever (101° to 104° Fahr.). The relatively high elevation of the temperature is of considerable diagnostic suggestion as compared, for instance, with acute rheumatism, or gout, or tuberculosis. An infected joint becomes swollen and hot, but does not usually exhibit any marked redness or, at the most, a very faint deep-lying pink flush. The slightest sudden or rough movement causes exquisite pain. The major part of the swelling consists of fluid which distends the joint cavity, though there is sometimes a little effusion into the strictures that surround the joint. The patient takes to her bed and objects to being moved in any way, so that the nursing is a matter of considerable difficulty.

In certain cases the effusion does not take place into the joint cavity itself but into the tissues and tendon sheaths around the joint, but this is uncommon. These are the cases that are particularly benefited by massage *in their later stages.*

In neglected cases, where the inflammation has been allowed to run riot for many weeks, fibrous adhesions are laid down in and around the joint, and fibrous ankylosis may result, partial or complete. In severe and long-neglected cases, ankylosis is almost certain to occur, and may be of a bony nature. In that case severe ulceration of cartilage has occurred. If the disease is seen early and treated early, such complications do not arise.

The diagnosis is made by finding gonococci in the urethral and cervical smears, and by noting pus in the urine. There is usually no difficulty in the diagnosis if smears are properly made and examined. What is so often done and what leads to so many mistakes is as follows. The house-physician extracts a history of vaginal discharge. He then takes a swab of this discharge and sends it to the laboratory for examination. As has been emphasized above (p. 97), this is an entirely useless and hopeless procedure. It is almost impossible to identify gonococci in a swab taken from the vaginal discharge of an adult. If only men could get this simple fact firmly into their heads, fewer cases of undiagnosed and untreated gonococcal arthritis would linger on till they reach the stage of ankylosis. Ankylosis should be a cause of shame to any professional man. It means a failure to establish early diagnosis and prompt treatment. We were sent five cases of this kind out of our first fifteen cases of arthritis.

In some neglected cases where fluid has been allowed to distend the joint cavity for weeks at a time, a permanent condition of lax capsule may be left behind which may take a year or two for recovery. Lax capsule is associated with wasted muscles. As the muscles recover their tone, the capsule tightens up again. In lax capsule cases there is always excess of fluid in the joint, which does not necessarily mean that infection is still present.

For many months or years after these joints have recovered they may become a little stiff or painful in cold or damp weather.

The gonococcus can seldom be recovered from the synovial fluid. It is permissible to puncture the joint and to withdraw some fluid for examination. This relieves tension and often acts favourably as treatment. But do not expect the pathologist to find gonococci in the fluid removed, and if he fails to find them do not therefore conclude that the arthritis is not gonococcal. The fluid is found to be a clear yellowish-green fluid, and is seldom if ever purulent. If obtained by open incision of the joint it is found to contain large flocculi of fibrin.

Ideal Points for Acupuncture of Joints

1. Hip-Joint.—Draw a line from the spine of the pubic bone to the top of the great trochanter of the femur. Divide Poupart's ligament into three parts, and drop a vertical line from the junction of the outer and middle thirds of this to cut the first line at right angles. Extend and rotate the femur outwards and feel for the head of the bone at this point. Drive your needle in directly backwards towards the head of the bone just to the inner side of the sartorius muscle. Feel for the femoral artery before you do this, and be careful to carry the needle well outside it.

2. The Knee-Joint—(*a*) *Crureus Pouch.*—Take a point three-quarters of an inch above and outside the upper corner of the patella. Drive the needle inwards, downwards, and backwards at that point.

(*b*) *Interline of Joint.*—Drive a needle horizontally inwards just immediately below the tip of the patella.

3. The Ankle-Joint.—Feel for the tip of the external malleolus. Draw a line three-quarters of an inch directly up-

wards from that point; from there draw a line three-quarters of an inch inwards at right angles. Enter the needle straight backwards at this point, which lies just below the angle of junction of the fibula and tibia. The needle will enter the ankle-joint well outside the anterior tibial artery.

4. The Shoulder-Joint.—Take a point three-eighths of an inch outside the coracoid process of the scapula. Drive in the needle directly backwards at this point.

5. The Elbow-Joint—(*a*) *Radio-humeral.*—Drive in the needle from without inwards at a point three-quarters of an inch below the external condyle of the humerus.

(*b*) *Main-Joint.*—Flex the arm. Drive in the needle just above the olecranon to its outer side.

6. Wrist-Joint.—Draw a line at the back of the wrist from the tip of the ulna to the tip of the radius. Find the centre of this line and drive the needle backwards at a point one-quarter of an inch above it.

Differential Diagnosis of Gonococcal Arthritis

The differential diagnosis is made from acute rheumatism, gout, septic arthritis, acute tuberculosis, subacute arthritis of unknown origin, syphilis, and injury.

1. From Acute Rheumatism.—This disease is commoner in children than in adults. Gonococcal arthritis is uncommon in children, but it does occur in 4 per cent. of cases of specific vulvitis. The inflammation spreads from joint to joint, and as one clears up another becomes affected. Fever is not very high (101° to 102° Fahr.). There is excessive secretion of sweat, which possesses a peculiar acid smell, and there is often evidence of myocarditis or endocarditis. Finally, there is the therapeutic test. Salicylates bring relief. Salicylates have absolutely no effect whatever on gonococcal joints, so that it is waste of time to exhibit them except for diagnostic purposes.

2. From Gout.—The joints are not only swollen and tender but are *reddened.* The redness may be a deep underlying blush, or may be a superficial and shiny redness. But redness is present, which it hardly, if ever, is in gonococcal cases. If the great-toe joint is affected, gout is almost a certainty. Fever is very slight and may be absent. Finally, there is an absence of the gonococcus in the urethra and cervix, and the therapeutic test. Gout

usually reacts quickly to colchicum and alkalis. These drugs have no effect on gonococcal joints.

3. From Septic Arthritis.—The patient is obviously very ill indeed and looks pale, slightly cyanotic, and profoundly poisoned. The joints contain pus and the infecting bacterium (*Bacillus coli*, streptococcus, *B. pyocyaneus*, *Staphylococcus aureus*) can usually be grown from the pus or from the blood. The joints are not only red and swollen but also oedematous. There is a form of subacute pyaemia which closely simulates gonococcal arthritis. The joints, however, are much less painful, and the infecting bacterium can usually be grown from the joint fluids and from the blood.

4. From Acute Tuberculosis.—There is no history or evidence of venereal disease. There is usually a history of injury to the joint some weeks previously. The joint swells up rather slowly but progressively. It is comparatively freely movable. On examination there is effusion into the joint cavity with thickening of the synovial membrane. The joint is distinctly hotter than its fellow, but is pale and not reddened. The muscles around the joint are wasted. The absolute diagnosis is often extremely difficult and is only to be made by therapeutic tests, some weeks of watching the effect of exercises and rest on the joint, and by the inoculation of fluid from the joint into guinea-pigs; but the diagnosis from gonococcal infection should be easy if adequate examination of the genitalia can be carried out. In cases of doubt in young girls it is a delicate matter to suggest to the mother the need for such examination. A specimen of urine can be asked for without arousing suspicion. If this is clear of pus, there is seldom any need to press for a more minute examination of the urethra. If pus is present, it is wise to press for a vaginal examination under anaesthesia.

5. Subacute Arthritis of Unknown Origin.—In girls of nubile age it is not uncommon to observe the slow development of comparatively painless effusion into one or both knee-joints or ankle-joints, which bears no relation to the injury, which gives no evidence of tuberculosis, and indeed clears up on treatment by movement, massage, and electricity rather than by rest, and where no evidence can be obtained of venereal infection. I have seen a fair number of these cases. Their cause I do not know. All I know is that they are awkward cases to have

dealings with. One does not like to suggest a venereal origin, and yet one cannot always exclude venereal disease without an adequate examination. If the urine contains pus one should insist on a pelvic examination under anaesthesia. If venereal disease can be excluded, the question then arises, are they tuberculous? for in that case long rest is needed, rest that the patient will be loth to give unless the absolute diagnosis is established. My advice in such cases is to puncture the joint and to inoculate the fluid into guinea-pigs. During the six weeks of waiting rest the joint in the 'best position' in a light plaster, and allow the patient up on crutches. If the guinea-pig inoculation is negative for tuberculosis, remove the plaster and employ massage and electric stimulation of the wasted muscles. Usually these joints clear up on such treatment in about eight to ten weeks, a fact which finally excludes tuberculosis.

6. Subacute and Chronic Effusions into the Joints (especially the knee-joints) may occur both in secondary, tertiary, and congenital syphilis. They are seldom mistaken for gonococcal arthritis, as they are usually accompanied by other evidences of syphilis. In cases of doubt a Wassermann blood-test may help in the diagnosis.

7. Traumatic Arthritis is not likely to be mistaken for gonococcal arthritis if a careful history has been taken. The mistake is only likely to be made in cases where there has been a partial rupture of a ligament or a muscle some weeks before, which has failed to unite properly and has led to a recurring painful chronic effusion and aching pains at night. There is always a tender spot at the site of the rupture. Such cases should not be forgotten in considering the diagnosis. These are the cases so long neglected by the medical profession that go to swell the coffers of the bone-setters.[1] They need manipulation under an anaesthetic to loosen or snap adhesions, followed by active exercises and faradic stimulation of wasted muscles. Usually they are rested (Hilton's *Rest and Pain*), the adhesions allowed to harden and the muscles to waste. I have treated innumerable cases like these as out-patients with successful results, particularly stiff shoulders and knees, rider's strains, and tennis elbows.

[1] Howard Marsh, *Brit. Med. Journ.*, 27 May 1911, p. 1231; James Mennell, *Lancet*, 7 February 1920, p. 297; R. C. Elmslie, *Lancet*, 13 October 1923, p. 821.

Treatment

In all cases of acute arthritis suspected of being gonococcal the patient should be put to bed till severe pain and fever are subsiding. Having proved, or knowing already, that a gonococcal arthritis is present, remember that this is a source of intermittent blood infection (see preface to *Common Infections of the Kidney*). Rest in bed at once diminishes to a minimum the risk of further doses of bacteria being forced into the circulation. The first thing to be done is to arrange for urethral irrigation. The doctor (or trained nurse) should carry this out twice a day for three or four days and then once a day (see p. 53), using potassium permanganate 1/4000 and working up quickly to 1/2000 or even 1/1000 if there is no irritation or pain caused by the irrigation. At the same time he should swab out the cervix and vagina daily with 2 per cent. flavine as described above for three or four days, then every other day for a week or ten days. Such treatment in our hands has proved most successful. Urethral irrigation should never be omitted on any pretext whatever. People find gonococcal joints troublesome because they hesitate to apply local treatment to the urethra. A favourable effect will be seen on the joint immediately the treatment is started, and in a week or ten days all evidence of acute inflammation will have subsided. *Local treatment applied to the urethra and cervix is the key to successful treatment of the joints.* Unless this treatment is carried out conscientiously and regularly no other treatment that I know of is likely to be of any avail. Carry it out early and carefully and you will find little difficulty in restoring your patients to health in a minimum of time and with movable joints.

Drugs

None of the ordinary drugs appear to exert any favourable effect on gonococcal joints. If any drugs are used in the acute stage they should take the form of intramuscular injections of colloidal manganese 0·5 c.c. given every third day for three doses. Usually we find no need to employ this.

If there is much burning and increased frequency of micturition an alkaline mixture containing sandal-wood oil will be helpful. During convalescence we employ tonics such as cod-

liver oil and malt, or one of the 'Bynin' preparations. Salicylates and colchicum are useless and depressing. The patient should drink large quantities of fluids and be placed under the general régime outlined above (p. 21). We have found no help from the use of vaccines, so do not recommend their use. Nor are they needed, as in all but the most severe cases the treatment outlined above will be found sufficient to bring about a rapid cure.

There exists, however, a certain type of case which should be labelled 'gonococcal septicaemia', wherein not only are all the joints of the body inflamed but other complications are present, such as iritis, endocarditis, and keratosis blennorrhagica.

In these cases local treatment takes longer to work a favourable effect, and this can be hastened by the employment of certain drugs advocated by McDonagh.[1] Intramuscular injections of 0·5 c.c. concentrated colloidal manganese are given every three days for three doses. If a markedly favourable effect has not occurred by this time an intramuscular injection of 2·5 c.c. of intramine is given and repeated again in four days' time. We have only had occasion to employ this treatment in a few cases, but as far as we have had experience of the treatment we believe that it can be distinctly helpful.

Local Treatment of the Inflamed Joints

I now propose to give a description of how to treat acute gonococcal joints themselves. I want to impress on my readers that most of the writings in the text-books on this subject are misleading. They were largely written when the profession was still under the influence of Hilton's book, *Rest and Pain*. In my opinion this is one of the most disastrous books that ever obtained a wide influence over the profession. It delayed progress for many years and allowed the 'bone-setter' a long innings. There has been too much rest applied to injured joints and muscles, a fact which the bone-setter has been clever enough to take advantage of. The application of *active* movements to damaged joints is only now coming into its own. As a result of experience during the war, and also as a result of watching gonococcal and other joint cases in large numbers for many

[1] *The Practitioner*, May 1918, p. 146.

years in the wards and out-patients of the London Hospital, I have come to the following conclusions:

1. Splints should seldom, if ever, be used for gonococcal joints.
2. Active movements of inflamed joints to be made by the patients themselves should be encouraged from the earliest moment.
3. The secret of success in treating an inflamed joint is to prevent wasting of the muscles that supply that joint.

The method of treating septic wound infections and purulent blood infections of joints by active movements has been admirably brought to the notice of the profession by Professor Willems of Ghent.[1] He found that in purulent infections of the joints, if he simply made small incisions into the joint cavity, and then encouraged and taught his patients to exercise their own joints regularly, in the first place pus was soon squeezed out of the joints, and in the second place wasting of the muscles was minimized and ankylosis avoided. I have long been convinced that the use of splints in cases of arthritis (except tuberculosis) is a vast mistake. I find that patients can be encouraged to exercise their own joints even when acutely inflamed. Trained intelligence and persuasive power are needed on the part of the doctor.

I start by explaining to the patient that if she keeps her painful joint quite still it may become fixed and stiff for life. I tell her that I know that she thinks that she cannot move the joint at all, and I agree that certainly she would not let me move it.

I will suppose I am dealing with an inflamed knee-joint. I place the knee on a long soft pillow so that it is supported from behind. I then ask the patient to make flexion and extension movements of the foot at the ankle. I point out that this exercises the muscles of the leg and so prevents their wasting. I then ask her to contract the quadriceps muscle of the sound leg so as to tighten the knee-cap without producing flexion of the knee. I then point out to her the wasted quadriceps of the diseased side, and explain to her that unless she exercises this muscle it will go on wasting. She then

[1] *Société de Chirurgie, Bulletins et Mémoires*, vol. xliv, 1918, p. 1098.

imitates the movements she has been making with the sound quadriceps by similar movements on the diseased side. She soon finds she can do this quite easily and becomes rather proud of it, and confidence is reborn within her. I then get her to tighten up the hamstring muscles on each side in similar fashion. Then comes the great test. I say, 'Try and bend your knee-joint ever so little without causing yourself pain'. At first she says, 'I can't'. I say, 'You can really if you will only believe me'. Finally she does gently and gingerly flex the knee-joint ever so little, and finds to her surprise that doing it herself does not hurt her. This is the end of the first day's lesson. The Sister of the ward or the nurse in charge is present at the lesson, and is asked to repeat the lesson after each meal until the patient can be trusted to take on the job for herself. At the next visit I find that the patient is already proud of her accomplishments. She can do active exercises of all the muscles of the leg, which are already less wasted. She proudly shows me that she can flex the knee perhaps 10 or 15 degrees and can extend it back again. She can even make an effort to lift the whole leg up from off the bed.

It will, I think, surprise those who have not previously tried this line of treatment to observe how quickly these joints react to it. In from ten days to a fortnight the muscles are no longer wasted and the fluid in the joint has nearly disappeared, all pain has ceased, and the patient can make almost the full range of movements of the joint. No massage is used and none is needed in the ordinary case seen at the outset and treated in this way from the very first. I can vouch that if my readers will only try this method of treatment they will be agreeably surprised at its beneficial and quick results.

The treatment is based on the great principle that it is the 'reflex' wasting of the muscles around an inflamed joint that does most of the mischief. The muscles waste; the patient keeps the joint rigid; ankylosis occurs. The muscles are too weak to overcome the fine adhesions that quickly form if the joint is not moved at all, the breaking down of which so often causes a renewal of the pain and swelling.

Keep up the power and size of the muscles by the active nervous impulses from the patient's own brain and spinal cord, and the battle is already half won.

It is not the fact, then, that all movements do an inflamed joint harm. Pain does not necessarily mean Rest. Movement short of severe pain does good, not harm. *Passive movements by others do infinite harm, as they cannot be controlled by the feelings of pain on the part of the patient.*

Persuade the patient to move the joint herself, and she does so controlled by her feelings of pain. Pain ensures that she will not overdo the movement. She can make slight movements without undue pain and with at most slight discomfort, and these are enough to prevent adhesions and to prevent wasting.

The stronger the muscle the firmer the tone exercised by the muscle on the joint capsule. This tone or pressure tends to reduce the effusion. The active movements of the joint also keep the fluid moving on into the lymphatics, and so promote absorption.

In between the active exercises the joints are covered with dry cotton wool held in place with a woollen bandage applied firmly but not tightly, and are laid on pillows. Elastic bandages should never be used over a joint, and on no pretence whatever should splints be applied. Great care is needed on the part of the nurse not to jar the joints. At night a compress of antiphlogistine may be applied, and removed in the morning.

Incision or Acupuncture

In knee-joints, and occasionally in other joints that are overdistended with fluid which is causing high fever (104° to 105° Fahr.), I am accustomed to make two incisions an inch long into the joint capsule on either side of the patella. The advantage of a small incision over acupuncture is that the large fibrinous clots that are usually present can be washed out of the joint, instead of being left for slow absorption. A gentle stream of warm, sterile, isotonic salt solution from an irrigator is used for this purpose. These incisions are left open and sprayed with a malachite green and corrosive sublimate ethyl-chloride spray (Hedley), after which they are covered with a loose sterile gauze bandage. This spray effectually prevents secondary infection from the skin. The patient is then encouraged to move the joint and exercise the muscles around, so that any fresh effusion of fluid is squeezed out of the joint through the incisions by the natural movements before it can

accumulate. I have found this method highly effective in severe cases.

In the past I have often drained off the fluid from these joints and washed them out with 1/8000 biniodide of mercury, and during the war I found that I could wash out potentially infected joints with 1/1000 eusol or 1/5000 flavine without producing any but beneficial results. All the same, my experience has taught me that there is no need to use any antiseptic wherewith to wash out a gonococcal joint, but to be content with isotonic salt solution. The object of lavage is not so much to destroy bacteria as to wash away the large fibrinous clots, which take time to be absorbed.

This method of active exercise of an acutely inflamed joint on the part of the patient, with or without drainage, is a real step in advance and deserves to be widely known. Any doctor who employs it will have to be prepared to spend some little time teaching the patient the exercises and seeing that they are carried out regularly. But the time so spent is repaid a hundredfold in the beautiful results yielded. Each joint needs exercises for the muscles above and below it, and these can be readily worked out at the bedside for each group of muscles, determining each particular movement of the joint.

Vaccines

Vaccines in my experience have proved disappointing in gonococcal joint cases. I have had the opportunity of testing their effect as applied without any other kind of treatment on a large number of joint cases in a military hospital. Their effect if used alone was exactly nil.

Ionization; Diathermy; Faradic Stimulation of Wasted Muscles

There are certain methods of treatment for gonococcal joints which can be used if they are available, and are a great help in hastening resolution and cure.

1. Ionization.—This can be employed, however severe the arthritis, and often brings immediate relief of pain and temporary subsidence of swelling. It can be employed every day for a period of twenty minutes. The joint is covered with ten to twelve layers of lint wrung out of 4 per cent. solution of potassium iodide, and outside this is laid a malleable metal

electrode attached to the negative pole. The positive pole is attached to a somewhat larger electrode wrapped in ten layers of lint rung out of normal saline. A constant current varying from 30 to 40 milliampères is then turned on for a period of fifteen to twenty minutes. The action is usually favourable, but whether it is the constant current that acts favourably or the passage of ions into the skin I do not feel sure.

2. Diathermy.—If a diathermy machine is available even better results can be obtained if the joint is heated up for fifteen minutes by diathermy before the ionization is applied, or the diathermy can be used alone. The current should be turned on until the joint feels pleasantly warm. Great care must be taken to avoid over-heating.

Failing a diathermy machine, relief to pain can be obtained by exposing the joint to dry heat from an electric lamp, or from a dry blanket pack rigged up over a metal cage and a lamp, or from hot sand.

3. Faradic Stimulation of Wasted Muscles.—As soon as the acute symptoms have subsided, the active exercises of the patient can be reinforced by stimulating the wasted muscles with some form of interrupted faradism applied to the different muscles in turn. This greatly reduces the time for the return of the muscles to their normal size and tone. As soon as a joint becomes inflamed its muscles waste away. This is probably due to a reflex call from the joint, and the tonic impulses that continually pass to its muscles and keep up their tone and nutrition are reflexly inhibited, so that the muscles waste. Apart from active movements initiated by the brain and spinal cord of the patient, nothing aids recovery of a joint more than to apply artificial stimulation to its wasted muscles. *A joint is not completely restored until its muscles have returned to their normal size.*

It is impossible to lay sufficient stress on this point. Attend to the muscles and the joint will take care of itself.

The best artificial stimulus for wasted muscles that I know is the Morton Static Wave. Unfortunately, very few suitable static machines are available. With this wave it is possible to produce the most powerful but absolutely painless tetanic contraction of muscles, and to attain in two or three weeks what it is not possible to attain under two months or more by the ordinary forms of faradic stimulation as applied to muscles.

Remember that an inflamed joint should never be looked upon as completely restored to health until the muscles which supply the joint have returned to their original size, and so are fit once more to support the joint in its full range of movements.

4. Where none of these methods is available, relief to pain can be obtained by means of a Bier's bandage. Apply a rubber bandage lightly to the limb above the joint until a definite engorgement of the veins of the limb below is produced. The skin of the limb should grow warmer to the touch. If it grows colder, the bandage is too tight. If this brings relief, the bandage can be kept on for hours at a time. When it is removed the limb is gently exercised by the patient, and then elevated on a pillow, to permit the blood to run back out of the limb.

Summary of Treatment advised for a Case of Acute Gonococcal Arthritis diagnosed Early

1. Rest in bed with inflamed joints supported on pillows as near their 'best position' as possible.
2. General regimen (see p. 21).
3. Start local treatment to urethra and cervix at once, and continue it daily till symptoms subside.
4. Teach the patient to exercise the diseased joint or joints actively from the first. Pain is the guide to over-activity.
5. For relief of pain use hot air, hot sand, radiant heat, diathermy, ionization, or Bier's passive congestion.

If these fail to act do not hesitate to give morphine in doses sufficient to alleviate suffering.

6. As the inflammation subsides increase the active movements and exercises, and reinforce them by electrical stimulation of the wasted muscles.

Treatment of Late or Neglected Cases

Unfortunately we do not always see our joint cases early, in the stage before fibrous adhesions have been laid down and ankylosis is threatened. Did we do so and institute treatment at once we should seldom if ever encounter these complications. It is therefore necessary to discuss how to deal with late, neglected cases of gonococcal arthritis. Take careful note that what I say below is only meant to refer to neglected cases and

not to early favourable cases. I refer to neglected cases where the diagnosis has not been made for some weeks, where the patient screams with pain directly you approach the joint or try any movement, where wasting of the muscles is profound, and partial fibrinous or fibrous ankylosis has already taken place with the joint in a bad position, usually one of flexion. Administer an anaesthetic (ether, not gas), and after full relaxation has been obtained *very gently* flex the joint fully and then manipulate it back into the 'best position'. Try to do this with one gentle movement. As you do so you will feel, and indeed may hear, delicate adhesions giving way. Having attained the best position, apply cotton-wool bandages and fix them with a few turns of a 'domette' bandage. Over all apply a light plaster bandage. Be careful not to apply any pressure—simply roll the bandages around the joint and work the plaster in with the hand. Apply only just sufficient plaster to keep the joint stiff in its best position so as not to overweight the limb. Carry the bandage far enough above and below the joint so as to control it properly, turn over the edges of the underlying bandages at each end and so round the plaster off neatly without sharp edges. The best position for each joint is as follows:

The ankle at right angles, the knee flexed to 10 degrees only, i.e. almost fully extended, the hip abducted to 30 degrees and fully extended (beware of a masking lordosis). The wrist should be extended some 20 degrees beyond a right angle, the elbow flexed at a right angle and half-way between pronation and supination, the shoulder abducted to an angle of at least 60 degrees with the outer border of the scapula.

I cannot sufficiently impress on my younger readers the necessity of placing joints in plaster in these their best positions. If ankylosis does occur it is then made to do so in the most favourable position. So long as such a position is attained ankylosis need not prevent a person from doing his day's work. As a matter of fact, in most cases ankylosis will not occur if the neglected joint is put absolutely at rest in plaster for about ten days to a fortnight. Every movement is so exquisitely painful in these neglected cases that it is impossible to nurse them and treat them locally unless they are put in plaster.

Having applied the plaster, proceed to treat the urethra and cervix for the first time while the patient is still under the

anaesthetic and return her to bed. After this employ daily some form of interrupted faradism if available, so as to produce painless rhythmic contractions of the wasted muscles above and below the plastered joint. This raises up the power and tone of the muscles and prepares them for use when the plaster is removed. Exhibit colloidal manganese. Continue local radical treatment daily, and at the end of ten days to a fortnight remove the plaster. The patient can now perform active exercises for the muscles and carry out active movements of the joint.

Now is the time to use massage (and also ionization and interrupted faradism), but on no account permit the masseur to carry out passive movements. Masseurs will need to be warned on this point. They sometimes think they know so much better than the doctor, but be firm and forbid all passive movements. Simply ask them to stroke away any thickening in the tendons and tissues surrounding the joint, and to knead the muscles above and below. If after some days of this treatment the joint is still limited as to its full range of movement, then if there is no fever it is permissible to administer gas and ether and very gently break down *some* of the adhesions. Do not try to do all at one sitting. Break down a few adhesions that can be felt to yield easily either with a gentle scrunch or a snap. Be content if you can gain an increase of 10 to 15 degrees in range of movement at the first sitting.

Rest the joint for twenty-four hours after this, then resume active exercises. If the full range of the movements be not obtained after this, once a week repeat the ether and endeavour to stretch or break down a few more adhesions. If the joint becomes stiffer and more painful after breaking down adhesions you are doing too much, or doing it too early and too often. Wait a little longer, or do a little less at each sitting. If you are doing it rightly you will find fuller movements and less pain after each sitting. If you proceed warily and slowly on these lines there are few joints that will not yield to time and patience. Plucky patients, who do not mind a little pain and help with their own stretchings, do better than timid patients. Such patients should be taught to perform exercises calculated to stretch the adhesions.

Occasionally the joint has become so disorganized by long-standing inflammation that the cartilage has been partially

destroyed. In these cases all attempts at breaking down adhesions may fail and appear to make matters worse. If so, make up your mind for ankylosis and put the joint up in plaster for five or six weeks in the 'best' position and obtain ankylosis in that position.

If, when you first see a case, there is definite grating in the joint, take radiographs of the joint and its healthy fellow. If there is erosion of cartilage, then it is absolutely necessary to put the joint up in plaster. When putting on the plaster, apply extension so as to separate the joint surfaces as much as possible. If the plaster is left on for two or three months the cartilage may 'skin over' the areas where it has ulcerated, and you may obtain a movable joint. More often you will have to be content with ankylosis in the 'best' position.

Hyperacute Septicaemic Cases

In certain families gonorrhoea becomes generalized at once in every member of the family who falls a victim to the disease. They seem to possess no inherent resistance whatever to this particular germ. In such cases every joint in the body may become acutely inflamed, accompanied by iritis and other serious complications. I saw a number of such cases in soldiers who were prostrated with fatigue and strain in the trenches before contracting the disease. These cases nearly all developed keratosis blennorrhagica, a skin condition almost unknown in civil practice, but one that indicates a poor degree of resistance to the disease. In these cases the doctor may be at his wits' end to know how to rest all the joints in their best possible position, and the mere nursing becomes a matter of extreme difficulty. If such cases are met with, I advise in addition to local treatment injection of colloidal manganese followed by intramine, as introduced by McDonagh, and as described above. These drugs are of undoubted value in such cases, but in the slighter cases I have not found any need to employ them.

Auto-Sero-Therapy

Auto-sero-therapy has been advocated especially for severe cases, and seems worthy of trial. I have had no occasion to try it, but it is as follows.[1] This method can be used where

[1] Ballanger and Elder, *Surg. Gynaec. Obst.*, November 1921, p. 574.

there are large quantities of fluid in a joint. The joint is punctured and sufficient fluid for the injection aspirated into a dry sterile syringe. The fluid so obtained is immediately reinjected into the gluteal muscles. From 15 to 50 c.c. may be injected, the larger the amount the better. The injections can be repeated every two to seven days, as long as any fluid can be obtained from the joint. It is supposed that the joint fluid contains specific antibodies. These authors report uniformly successful results from the use of this treatment in twenty-seven patients. Relief of pain occurs within twenty-four hours, there is an immediate drop in the temperature, and all the severe symptoms are quickly ameliorated. Where no fluid is available in the joints, serum can be obtained by puncturing a vein and allowing the blood to clot. This treatment, curiously enough, though it may influence favourably arthritis and epididymitis, has no curative effect whatever on the local urethral and cervical discharges.

Massage

More harm can be done by unskilful massage than by any other treatment. Unfortunately some masseurs have an idea that they know everything, and that no doctor knows anything about massage. Massage or rubbing acts in two ways. When applied to the skin lightly it produces a dilatation of the surface blood-vessels, so that the limb appears warm and glowing. It draws blood from the deeper parts and, acting reflexly through the nerves, allays pain and deep inflammation. If masseurs would be content with producing this effect in the skin above and below a gonococcal joint I would have no quarrel with them. Rubbing can also be used to coax serous and fibrinous effusion out of the parts deep to the skin, such as tendon sheaths, tendons, and muscles. Deep but gentle kneading and coaxing are required. Only permit this deep rubbing and kneading when the acute stage is subsiding, and where there are definite localized tender nodules in the tendons and ligaments round a joint, or if there is gross oedema. Unless these are present, deep kneading is not required. But the essential thing to remember when employing masseurs is to forbid them to make use of passive movements. Until acute inflammation has subsided completely, passive movements can only do harm. There is no

certain guide to control such movements and prevent their doing harm. Pain at once tells a patient when she has herself made a too active movement of an inflamed joint. The tense muscles also prevent movements that are too painful, and that can relight inflammation. This is why passive movements may do harm. They are impossible to control. They are likely to be overdone and light up the trouble again and again. If a masseur will promise to employ only the lightest effleurage, and to apply petrissage only to those tender and oedematous spots which I indicate, and will agree not to carry out passive movements, then and only then will I employ him in a case of gonococcal joints. I am writing thus plainly of massage because massage has been greatly overdone during the war. Massage was supposed to be the remedy for everything, and a number of insufficiently trained people were pushed through a course. Only a small percentage of these were really fit to carry out this difficult and, if not controlled, very dangerous form of treatment.

To show what can be done without massage and with active movement on the part of the patient, I had a fractured femur ward during the war, and from this a number of my cases were passed for active service within six to nine months of being wounded. Yet I could not employ masseurs, as there were none available, so I trusted entirely to early and increasing active movements and exercises carried out by the patients themselves, encouraged by personal teaching.

CHAPTER IX

BACTERIOLOGY

BY

G. T. WESTERN, M.D.

Although in a proportion of cases of acute infection of some portion of the female genito-urinary tract a clinical examination, taken together with the history, will enable one to arrive at a correct diagnosis of gonorrhoea, the only absolute method of diagnosis at present available is the demonstration of the gonococcus. The value which is to be attached to the converse, namely, the failure to demonstrate the gonococcus, must depend on the methods employed and the skill and experience of the examiner. On this question there is at present a wide divergence of opinion. On the one hand, some workers claim that it is seldom possible to demonstrate the gonococcus in the female except in the acute stage, and consequently place no reliance on a negative finding. On the other hand, others claim that by means of examinations by film preparations and cultures it is possible to obtain evidence of the absence of gonorrhoeal infection which can be relied on with considerable confidence. While admitting that the positive demonstration of a bacterium must always be stronger evidence than the failure to find it, it is possible, with experience and with the best bacteriological methods, to obtain evidence of the absence of gonorrhoeal infection which may be acted on with confidence.

Bacteriology

The gonococcus was first described by Neisser in 1879 as occurring in cases of acute gonorrhoeal urethritis and conjunctivitis. He showed that in recent acute cases it was present in considerable numbers and was usually the only organism demonstrable.

The gonococcus was first cultivated on an artificial medium by Bumm in 1885. He also proved its causal relationship to gonorrhoea by inoculation experiments.

The gonococcus is a diplococcus which divides by fission. The sides of each pair of cocci which are in juxtaposition are

flattened, thus giving the kidney shape so typical of this organism. This characteristic is very readily seen in the cocci which occur in the pus of a case of acute gonorrhoea, but in cultures it is not so marked, the cocci occurring in irregular masses morphologically indistinguishable from other Gram-negative cocci.

In early cases of the disease the gonococcus is found both intra- and extra-cellularly. A small minority only of the polymorpho-nuclear cells will be found to contain cocci, and these frequently contain large numbers, and may appear swollen up and may stain less intensely than the mass of the cells. These swollen-up cells packed with cocci are sometimes described as 'mulberry masses' or 'gonorrhoeal cells', and are very typical of the acute condition. In specimens taken at a late stage, however, and in chronic cases, this appearance is not so usual, and frequently no intracellular cocci are to be found at all. A negative finding, however, must not be given solely on the absence of intracellular diplococci.

Staining

The gonococcus takes up all the ordinary dyes readily, and does not retain the stain when treated by Gram's method. The fact that it is Gram-negative at once differentiates it from other cocci which are commonly found in the same sites, such as the staphylococcus and various forms of diplococci and short-chained streptococci, which retain the stain by Gram's method.

It is of great importance that no single-stain method should be allowed to take the place of Gram's method or one of its modifications in the diagnosis of gonorrhoea.[1] A staphylococcus which is rapidly dividing frequently shows the flattened sides

[1] The chief objection to the routine use of Gram's method of staining by the practising physician has been that it is more complicated than a single-stain method, and that the aniline-water-gentian-violet is not stable for long periods of time. Jensen's modification of Gram's method removes these difficulties, and affords an easy and reliable method of obtaining the advantages of a differential stain. Jensen's method is carried out as follows:

1. Stain for half a minute in a 0·5 per cent. aqueous solution of methyl-violet (6B).
2. Pour off the methyl-violet and pour on iodine solution (iodine, 1 part; potassium iodide, 2 parts; distilled water, 100 parts) for one minute.
3. Wash off iodine with absolute alcohol until decolorized.
4. Counter-stain with neutral red 0·1 per cent.
5. Wash in water, dry, and mount.

characteristic of the gonococcus, and also occurs in considerable numbers in the pus cells and epithelial cells. These may in fact exactly resemble intracellular gonococci and, especially in subacute or chronic conditions, be indistinguishable from gonococci by single-stain methods.

The other Gram-negative cocci from which it may be necessary to differentiate the gonococcus are the meningococcus and *Micrococcus catarrhalis*. It is seldom that there can be any confusion between these in cases of suspected gonorrhoea, but where the coccus has been obtained from some metastatic focus or from the blood-stream it may be necessary for the differentiation to be made. This is done by the differences in growth on artificial media and by fermentations of certain sugars as shown in the following table:

	Maltose.	Glucose.	Saccharose.
Gonococcus	−	+	−
Meningococcus	+	+	−
Micrococcus catarrhalis . .	−	−	−

+ =Production of acid. − =No fermentation.

It is important to be certain, in carrying out fermentation reactions of organisms whose growth is apt to be delicate, that absence of fermentation is not due to absence of growth.

Cultures

As has been mentioned already, the gonococcus was first grown on an artificial medium by Bumm in 1885. He used media containing ox, sheep, and human serum. He found the growth was very poor. Wertheim in 1891 grew the gonococcus on agar containing human blood serum, or serous fluid which had not been heated above 45° C. Numerous modifications of this have been recommended, but many workers have failed to realize the importance of not heating the serum.

Agar, on the surface of which has been smeared some fresh blood, has frequently been recommended. The growth by this method is poor, and, although it is possible thus to isolate the gonococcus from an acute case, yet, as evidence of the absence of the gonococcus in a case where the diagnosis is doubtful or

where confirmation of cure is required, such a method is quite unreliable.

It is obvious that if cultures are to be used as a test of cure, and absence of growth to be taken as evidence of the absence of the gonococcus, we must have for use a medium which will grow the gonococcus with certainty, and with such rapidity and profusion that it is unlikely to be overgrown and masked by other organisms.

One has now for some twenty years used a medium made by adding 10 to 20 per cent. of unheated hydrocele fluid to ordinary nutrient agar (2 to 3 per cent. P_H 7·6). The hydrocele fluid should be obtained by means of a sterile cannula (free from antiseptics) and received direct into a sterile plugged vessel. The fluid should be quite clear and bright yellow or pale in colour. Hydroceles which have been tapped previously sometimes contain a fluid with a chocolate tinge, owing to there having been a small haemorrhage at a previous tapping. This renders the fluid less suitable for growing the gonococcus. Hydrocele fluid may be stored indefinitely, and does not lose its value as a medium for growing the gonococcus. To make up the medium, melt the required number of tubes of agar (each tube containing about 5 c.c. of agar) and cool again to 48° C. Warm the hydrocele fluid to 42° C. With sterile pipette or syringe add 1 c.c. of hydrocele fluid to each tube containing 5 c.c. of agar, roll to mix without causing bubbles, and slope at once.

On this medium an abundant growth can be obtained, and the gonococcus can be isolated readily in chronic and carrier cases.

On this medium the colonies in twenty-four hours are considerably larger than a streptococcus colony, and almost as large as a staphylococcus. They are translucent, convex, with clear-cut edges, and tend to move as a whole when touched with a wire. They readily emulsify in saline.

Ovarian fluid may be used instead of hydrocele fluid, but it is not usually so easily obtainable and is often tinged with altered blood.

Ascitic fluid has not in my experience given such good results as hydrocele fluid. It is not so uniform in composition, as it contains varying amounts of cellular elements, and in addition has the disadvantage of frequently not being sterile.

Numerous other media have been devised by various workers for growing the gonococcus. For a discussion of these the reader should refer to the Medical Research Council's Special Report Series, No. 19 (revised), p. 10, and Appendix I, pp. 16–19.

Pathogenicity

The gonococcus is highly pathogenic for man, and an attack appears to confer no immunity.

It is non-pathogenic for animals.

Examination of Suspect Cases [1]

Apparatus necessary:

Platinum wire loop in holder.
Spirit lamp or bunsen burner.
Microscope slides (these are more convenient for handling than cover-glasses).
Culture medium.
Swabs, some on holders.
A speculum (Cusco's is the most convenient, as it gives a good view and can be used single-handed).
Microscope and stains.

Cases which come for bacteriological examination may be:

1. Acute recent infections.
2. Chronic infections, with or without a history of a previous proved acute gonococcal infection.
3. Treated cases requiring a test of cure.
4. Cases in which there is no history of any infection, but who have been accused of infecting another individual.

As has already been pointed out, the only absolute method of diagnosis at present available is the bacteriological demonstration of the gonococcus. The absence of any discharge clinically demonstrable and the apparent normal condition of the parts are no evidence at all of the absence of the gonococcus. Further, there is ample evidence available that the gonococcus may be harboured in the female genito-urinary tract for long

[1] The methods of examination described in this report have been carried out in conjunction with Mr. F. S. Kidd and Dr. Malcolm Simpson on a large number of cases during the last twenty years with results on which we have learnt to rely with considerable confidence.

periods without producing any signs or symptoms, and so long as the gonococcus is present that individual must be looked upon as a carrier of infection and capable of transmitting the disease to others.

If any discharge is seen, films and cultures should be made.

If there is no visible discharge, the platinum loop should be introduced into the urethra, and the mucous membrane stroked forward with it and films and cultures made. Bartholin's glands should next be examined, and, if it is possible to express any material, films and cultures should be made.

The cervix should then be exposed with a speculum. Any discharge on the outside of the cervix should be wiped away. (The vaginal secretion is normally acid in reaction and the gonococcus is very sensitive to acid, so much so that even where it is easy to demonstrate it in the cervix it is often impossible to find it in the discharge lying in the vagina.) Films and cultures should be taken from within the cervix.

The film preparations made from the various sites as above should be stained by Gram's method or by one of its modifications and suitably counterstained.

In acute cases, as has been mentioned already, the picture seen is striking and easily recognized. In chronic cases and in cases where the question to be decided is whether cure is complete, a correct decision is not so easy. Films from the normal urethra may contain an occasional leucocyte, but the main constituents are epithelial cells. It is common to find a few bacteria in the first inch of the normal urethra. These may be Gram-positive bacilli or diplococci, short-chained streptococci or staphylococci. These organisms will commonly be found in the chronic cases which come up for examination. Gonococci if present in these cases will probably be chiefly extra-cellular, and must be differentiated from:

1. Some forms of staphylococci which when partly degenerated may lose the stain by Gram's method. These forms are usually seen forming members of a group the majority of which are Gram-positive, also they will not show the characteristic morphology which the staphylococcus imitates when rapidly dividing.

2. Coccoid forms of coliform bacilli. These will be distinguished by the fact that every grade from a coccus to a bacillus will be found, and by their size being greater than that of the gonococcus.

The vaginal secretion normally is acid in reaction and contains a number of bacteria. The bacillus of Döderlein is common, and is usually unassociated with many other bacteria. It is a large Gram-positive bacillus and does not grow on artificial media. Diphtheroid bacilli are common in this site. Coliform bacilli are much less common than one might expect from the anatomical surroundings.

A small thin bacillus, which may or may not retain the stain by Gram's method, is frequently seen in large numbers. It appears to have no pathological significance and does not grow on the ordinary artificial media.

Gram-positive cocci occur in the vagina and cervix similar to those described above as occurring in the urethra.

The same points hold in the differentiation of the gonococcus in these sites as have been mentioned above in discussing the urethra.

The complement-fixation test for the gonococcus has during the last few years been developed as a means of diagnosing gonococcal infection or as a test of cure. This test will in all probability come into wider use in the future, and may be of assistance, provided that its limitations are appreciated. It is, however, unlikely that it will carry the same weight as the complement-fixation test in syphilis. Fixation will not be obtained in early cases, and is frequently absent in acute gonorrhoea for some weeks. In cases where the infection has remained narrowly localized the reaction is frequently absent. Thus where the urethra only is infected and the cervix has escaped it is common to get no fixation. On the other hand, evidence has accumulated to show that a positive fixation test is strong evidence of a gonococcal infection past or present. The type of cases, therefore, in which the reaction is likely to be of most service are those where the gonococcus cannot be found, but where there are conditions suggesting the possibility of gonococcal metastases. In such cases a positive reaction should carry great weight.

In cases where a gonococcal septicaemia is suspected, blood

culture should be taken. The gonoccoccus grows more readily if a considerable volume of broth is used to dilute the blood (25 volumes of broth to every volume of blood). No enriching material need be added beyond the blood itself. In cases of gonorrhoeal endocarditis the gonococcus can be grown from the vegetations even where the cadaver has been kept in the refrigerator for twenty-four hours.

CHAPTER X

OPHTHALMIA NEONATORUM

(Purulent Conjunctivitis in a Newly-born Child)

BY

M. S. MAYOU, F.R.C.S.

Amongst all the diseases of the eye there is none which causes so much blindness. It is the cause of blindness in 27 per cent. of all cases admitted to the blind schools of England, which is a very high proportion, considering that the disease can almost entirely be prevented and eradicated without injury to the sight, if proper prophylactic and other treatment is stringently carried out.

The gonococcus is the cause of 60 per cent. of the cases, and, indeed, practically the only cause with the exception of the streptococcus, when the affection is of such severity as to give rise to corneal complications. The other organisms which make up the remaining 40 per cent. are the staphylococcus, *Bacillus Morax-Axenfeld*, and, more rarely, *B. coli communis*, streptococcus, pneumococcus, *B. Klebs-Loeffler*, and *B. Koch-Weeks*.

The infection of the infant's eyes from the vaginal discharge of the mother may take place:

(*a*) *In utero*. Children have been born by Caesarean section with fully developed ophthalmia neonatorum and even ulceration of the cornea. The infection in these cases may take place through a tiny hole in the membranes or after the membranes have ruptured. It is these rare cases which it is impossible to prevent by the use of prophylactic treatment.

(*b*) During or immediately after birth. This is the most common time at which infection takes place, as the child's eyelids come in contact with the vaginal discharge.

(*c*) Some time after birth (secondary infection), which may take place from the discharge on the towels, or water, &c., used for the mother.

Diagnosis

The diagnosis is usually very simple, but there is one condition, for which it may be mistaken, namely, congenital

lachrymal obstruction with a large purulent mucocele. In these cases usually one eye only is filled with pus, whereas ophthalmia neonatorum generally affects both eyes. As a rule, although the sac may be very distended, there is no swelling to be seen over the lachrymal area, as the fat cheeks of the infant hide it, but pressure over the lachrymal sac will cause regurgitation of pus into the eye and so render the diagnosis easy.

Symptoms

As the child's eyes are most frequently infected during the process of birth, the common day of onset is the third day after birth. In the early stages the eyelids and conjunctiva become intensely swollen and red, and there is a sero-sanguineous discharge from the conjunctiva. This usually lasts from two to thirty-six hours, and is then followed by a purulent stage, the pus being of a thick creamy character. It is during these early stages that severe corneal ulceration is likely to take place. After the first week the swelling of the eyelids begins to subside, and the discharge continues in large quantities; but with proper treatment this gradually ceases in from three to six weeks.

When a child is brought up with ophthalmia neonatorum, the greatest care should be exercised in the separation of the lids, since it is impossible to say what the condition of the cornea may be, and any undue pressure on the globe may lead to the rupture of an ulcer which is on the point of perforating, or extrusion of the lens through the base of the ulcer.

The baby should be held by a nurse, the head being placed on or between the knees of the surgeon, who should wear protective glasses to prevent any chance of infection of his own eyes. Naturally, the most careful antiseptic precautions with regard to the hands, &c., should be observed after examining such a case. Rubber gloves should always be worn. Special tables are used in institutions for the treatment of this disease (Fig. 9).

Having separated the eyelids and washed or wiped away the discharge, the cornea should be first examined, for if it is found to be clear a good prognosis may be given. The palpebral conjunctiva in severe cases is red and swollen, and its surface is much papillated. Occasionally in mild cases there is much follicular formation, especially in the lower fold. The ocular con-

junctiva, as a rule, is not so much affected, and gonorrhoeal cases in infants, unlike those in the adults, show practically no chemosis, which is probably due to the fact that the eyes are always closed, whilst in the adult the ocular conjunctiva in the palpebral fissure is principally oedematous, owing to the swollen lids causing a certain amount of constriction.

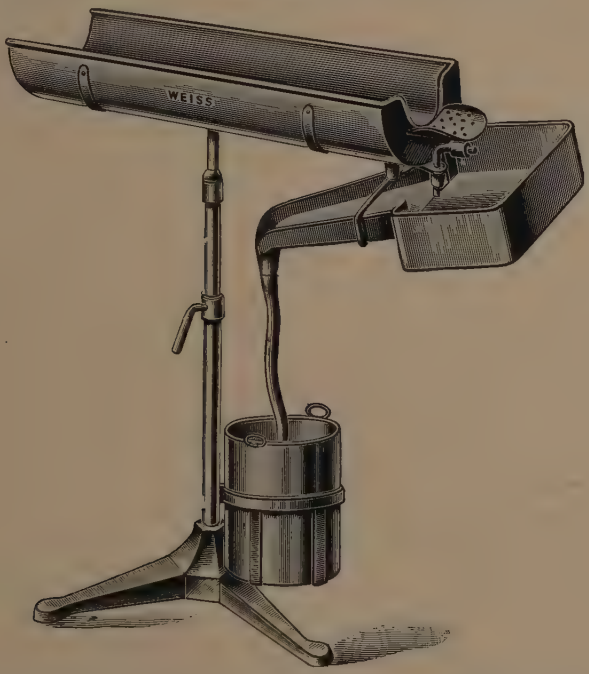

Fig. 9.—Author's table for the treatment of ophthalmia neonatorum.

It is impossible to say with certainty, without a bacteriological examination, what organism is the actual cause of the infection, but if a case comes with a profuse, thick creamy discharge which, in the later stages, becomes flocculent, with a very little mucus in it, one can almost with certainty say that it is gonorrhoeal, more especially if the cornea is affected, since the other organisms do not as a rule attack the cornea, with the exceptions perhaps of the streptococcus and the Klebs-Loeffler bacillus.

On the other hand, if a case comes with a slight discharge and red lid margins, the skin around the lids being involved,

the infection is probably due to the Morax-Axenfeld bacillus. This latter organism rarely occurs alone in infants, but is usually associated with the *Staphylococcus albus*, and therefore, contrary to that found in adults, the discharge is often a slightly purulent one.

Conjunctival false membranes are not at all infrequent in infants, and are not necessarily of diphtheritic origin.

Prophylactic Treatment

Prophylaxis plays a most important part in the prevention of ophthalmia neonatorum. Credé, who introduced the method known by his name, reduced the percentage of ophthalmia neonatorum in the Leipzig Lying-in Asylum from 10·8 to 0·1 per cent. On the delivery of the head, the eyelids should be wiped free of discharge, then, as soon after birth as possible, the eyes are washed out with a solution of boric acid. If the mother is known to have had a vaginal discharge before birth, douches should be given before rupture of the membranes, and in addition to the use of the boric acid, silver nitrate 2 per cent. should be instilled into the eyes, and subsequently neutralized with salt solution, as infants at birth have no lachrymal secretion, or flavine 1/1500 in castor oil can be used instead.[1]

Curative Treatment

Ophthalmia neonatorum is a notifiable disease, and information should be given to the District Medical Officer immediately. In most big towns special hospitals are provided, and the mother and child should be removed at once by ambulance to this Institution, unless provision can be made for a nurse constantly to attend the child night and day.

In the London area, St. Margaret's Hospital, Leighton Road, Kentish Town, is the special hospital for this disease, and is under the care of the Metropolitan Asylums Board, who will send an ambulance immediately on application by telephone without fee. It is of the greatest importance that treatment should be started at once and consecutively carried out. If possible, the mother should nurse the child herself, as, if there is any deterioration in the health of the child, the cornea is much more likely to be affected. The treatment consists of the

[1] *Trans. of Ophthal. Soc. of U.K.*, vol. xl, 1920.

constant washing out of the conjunctival sac every hour in severe cases, every two hours in less severe cases, and every three in the mild cases. The best lotion to use is eusol 1 in 10, or failing that, boracic acid lotion, 10 gr. to the ounce, to which 5 grains of bicarbonate of soda have been added. The lotion should be used cold or iced, as cold inhibits the growth of the gonococcus, and at the same time prevents excessive swelling of the lids. After each application of the lotion, flavine 1 in 1500 in castor oil should be instilled into the conjunctival sacs. A supply of wool, which must be burnt directly after use, should be given to the nurse to wipe away the discharge from the eyelids. Once a day the lids should be everted and the conjunctivae rubbed with a solution of protargol 10 per cent. The nurse should be warned against the risk of infection to herself, she should be provided with protective glasses, and rubber gloves should be used.

If only one eye be affected, care should be exercised in order to prevent the spread of infection to the other. This is best obtained by a pad of cyanide gauze sealed down on the nasal side by flexible collodion or strapping. It should be inspected for the first few days to see that infection has not taken place.

Treatment should be continued with the lotion for at least a month after all discharge has ceased, since the gonococcus has been found in the conjunctival sacs twenty-eight days after the discharge has subsided.

The duration of treatment varies considerably, according to whether the case is severe or mild. If mild, the case is usually free from discharge by the end of the second week of treatment; if severe, as in the gonococcal form, the average duration of treatment is about six weeks.

When the cornea becomes affected the first sign is that it becomes hazy, and has a ground-glass appearance; it may either clear up or break down into a corneal ulcer. Directly there is any sign of the cornea becoming affected atropine should be instilled.

In nearly all cases in which corneal ulceration starts, the child has either had some slight illness or is in a debilitated condition. The diseases which lead to debility are gastro-enteritis from improper feeding and congenital syphilis. In the former instance there is no question that the best way of

getting over this difficulty is that the mother should nurse the child herself, or, if this is impossible, it should be put under the best hygienic conditions both as regards feeding and open-air treatment. At St. Margaret's Hospital there are provided open-air wards for this purpose.

Corneal Ulceration

The types of ulcers are three:

(1) Small puncture ulcers which rapidly perforate the substance of the cornea with very little infiltration, which run their course in about twenty-four to forty-eight hours, leading to a slight nebula possibly with an anterior polar cataract or adherent iris.

The children are usually strong and healthy, and in all probability the infection is a local one through some small abrasion, and is limited in extent because the nutrition of the cornea is good and the resisting power high.

(2) Large ulcers with considerable sloughing and infiltration of the cornea.

(3) Sloughing of the whole of the cornea.

In these two groups 75 per cent. begin at the junction of the lower third with the upper two-thirds of the cornea, probably on account of exposure and the line of union of the eyelid. They lead to dense opacities, and in a case where sloughing of the whole cornea occurs the lens is often extruded, and after the wound has healed secondary buphthalmos is very liable to occur.

For further details, see *Transactions of the Ophthalmological Society of the United Kingdom*, vol. xl.

CHAPTER XI

NOTES ON PROCTITIS, OSTEITIS, AND VACCINES

Gonorrhoeal Proctitis

Infection of the rectal mucosa with the gonococcus is seldom met with in this country, though it is said to be of common occurrence in warm climates where sexual aberrations are indulged in. It is more often encountered in women than in men, and a full account is given of it in Luys' *Text-Book on Gonorrhoea*. We have seen half a dozen cases in men, and a similar number in women.

Gonorrhoea can arise in the rectum from innocent and indirect infection. It has been suggested that pus can flow back out of the vulva and infect the rectum as the patient lies on her back. We feel very doubtful as to the possibility of this. Infection can undoubtedly arise from an enema nozzle, and for this reason enemata should never be administered to infected women. It usually arises, however, from the practice of anal coitus with a woman, a practice that is more common than is usually supposed.

Symptoms are usually absent, though the patient may complain of a burning or itching in the rectum. As a rule no obvious spontaneous discharge is to be seen issuing from the rectum, as the sphincter keeps the discharge well within the rectum itself, so that the peri-anal tissues appear quite healthy, and unless a patient gives a direct history the complication is likely to be missed. Sometimes a drop of pus can be squeezed out of the rectum by inserting a gloved finger into the vagina and pressing from above downwards on to the recto-vaginal septum. A superficial fissure can sometimes be felt on the posterior wall of the anus, and we have also seen a single prominent condyloma, shiny, soft, and almost painless, in the same situation, such as has been described by Jullien.

The diagnosis can seldom be clinched except by examination with a proctoscope. On inserting this instrument the mucous membrane is seen to be reddened and inflamed, and covered with drops of pus. Pick up one of these drops on a platinum

loop and make films. The gonococcus can in this way be demonstrated.

Complications, which are rare, may consist of an acute peri-proctitis with ischio-rectal abscess, in which gonococci are seldom to be found; a chronic peri-proctitis in the form of a firm hard sheath of inflammatory fibrous tissue which can be felt bulging into the rectal walls and gripping the examining finger; and, finally, stricture of the rectum.

In the early stages we have been accustomed to order a daily irrigation of the rectum with potassium permanganate 1/4000 by means of a rectal tube and funnel. As the disease subsides we apply local treatment through a proctoscope. With the patient in the knee-elbow position a proctoscope is passed and the rectal mucosa is swabbed out from above downwards with silver nitrate in increasing strengths, starting with 5 grains to the ounce. In between the treatment relief can be obtained at this stage by injecting Beck's bismuth paste into the rectum (bismuth subnitrate, 1 part; soft paraffin, 9 parts; heat on a water bath one hour). Under this treatment we have been able to cure these cases in a few weeks.

Gonococcal Osteitis

It is of interest to note that occasionally a gonococcal peri-ostitis or osteitis will occur. We had one case in our series, a periostitis of the ulnar bone, which cast a shadow on the X-ray plate of an excrescence on the shaft of the ulna, containing a central light area as if it contained pus. Movement irritated this, so we bound it up in plaster for six weeks, and carried on local treatment, whereupon it entirely subsided. We have seen other instances similar to this. Radiography is necessary for diagnosis and gives the important indication, namely, rest in plaster rather than massage and movement, just as in the case of fracture-sprains, and traumatic myositis ossificans.

A Note on Vaccine Treatment

Not one single dose of vaccine was administered in our clinic from its commencement in 1917 up till the year 1921. We were determined not to cloud the issue or to confuse judgement. We wished to determine what results could be obtained by the use of 'antiseptic' treatment applied to infected foci. If we had

used vaccines it might have been said that the vaccines had produced the cures, so we made up our minds to run the department without exhibiting vaccines. We have thus proved that it is possible to cure gonorrhoea in women by the application of suitable antiseptics in suitable strengths to the infected tissues. So far as I am aware no one has yet treated a large series of gonorrhoea in women using vaccines only and no other treatment. If this were done, and it could be shown that vaccines used alone could produce cures in as quick an average time as with antiseptic treatment, then it might be possible for us to believe in the curative power of gonococcal vaccines. These cases would have to be submitted to the same minute and careful tests that we have applied to our cases. It is impossible to evaluate vaccine treatment if other treatment is used at the same time. If gonococcal vaccines can produce immunity to the gonococcus, then they ought to be able to bring about a cure in every case, apart from any other treatment. The more we see of cases that have had prolonged vaccine treatment before they come under our care, the more convinced do we become that present-day gonococcal vaccines of every type and kind cannot and do not produce sufficient immunity to bring about a cure, or, in other words, the removal of the gonococcus from the body. We see numerous cases which have had vaccine treatment for months and even years of every sort and kind. We have not yet seen a case where the gonococcus has been got rid of from the body by vaccine treatment used by itself. In a number of cases we feel that vaccine treatment has done harm and has prolonged the disease. The added dose of gonococcus poison has simply served to induce a prolonged negative phase and to destroy the resistance of the body to the germ.

If one revises the achievements of vaccine therapy, one realizes that it can find its chief successes in those infections where the body possesses a natural power of producing a high and prolonged immunity to a particular infection. For instance, one attack of small-pox nearly always confers a lifelong immunity to the disease. A cow-pox vaccine therefore acts as an efficient substitute for an attack of natural small-pox, and confers an immunity which lasts for a good many years. A single attack of typhoid fever confers on the sufferer an immunity of some years' duration. Here again typhoid vaccine will

undoubtedly confer an artificial immunity lasting a considerable time.

But when we come to deal with an infection like a gonococcal infection we find that a man or woman can suffer from gonorrhoea and be cured of it, and yet within a few days or weeks can again become infected with a fresh gonorrhoea. In other words, there appears to be no such thing as any prolonged natural immunity to the gonococcus. This may be the reason why an artificial gonococcus vaccine can confer little if any artificial immunity which can help in the cure of the disease.

Nevertheless, we hope that further research will solve the riddle, and that a more efficient gonococcal antigen will be discovered which can stir the tissues into an efficient state of prolonged immunity. The principle of artificial immunization by means of vaccines holds out the most hopeful line of research for finding a specific and rapid remedy for gonorrhoea, but the problem of manufacturing an efficient antigen still remains a mystery.

CHAPTER XII

PROPHYLAXIS

VERY little consideration has been given to this subject as compared with the extensive work carried out in connexion with the male. One of us (F. K.) brought forward certain proposals for prophylaxis in women when called to give evidence before the Committee of Inquiry on Venereal Disease, Ministry of Health, 1923. We wish to thank the chairman, Lord Trevethin, for his permission to publish the evidence here.

EVIDENCE

PERSONAL IMMEDIATE PROPHYLAXIS

I have learnt through prolonged practical experience that properly designed prophylactic packets supplied with printed instructions and used by intelligent persons fulfil their purpose, namely, to prevent venereal disease. I consider that it is idle to deny this.

In 1908 I designed a prophylactic packet, which I exhibit, called 'Outfit B', and this has been supplied on my prescription through my chemists (Wallas & Co., 36 New Cavendish Street) to a number of my patients after I have cured them of venereal disease. (I am not satisfied when I have cured an individual of venereal disease, but consider it right to inform him how he may ensure that he does not develop such disease again, not only for his own sake but for that of his family and the community.)

I have seen many of these patients years later. Some of them have informed me that they have ever since used the outfit and that it has never failed. Others have used it for years, and then have mislaid it or lent it to a friend. Very often they have immediately caught venereal disease again.

These outfits contain three chemicals: (1) a 33 per cent. calomel ointment for rubbing on the outside of the penis; (2) a 10 per cent. protargol jelly for injecting into the urethra; (3) tablets of corrosive sublimate, five of which are to be dissolved in a basin of water to make a lotion for washing the parts. Printed directions are enclosed which read as follows:

'After the act, within half an hour, pass water. First dissolve

five tablets in one pint of water and wash the parts and dry them.

'Then anoint the outside with the white cream in the short nozzle tube.

'Finally, fill the first inch of the canal with the brown jelly in the long nozzle tube.'

INSTANCES

1. Seen first in 1913; had had syphilis once, gonorrhoea many times; cured by me then of gonorrhoea; Outfit B ordered. This man states in 1922 that he has used the outfit on innumerable occasions since 1913 and it has never once failed him. He went astray the previous night, and as he had not got an outfit handy he came to have a prophylactic irrigation. This was carried out and proved effective.

2. A colonial doctor used my outfit for many years and never had any trouble. One day he left it at home and got caught by a woman. He immediately developed gonorrhoea, the first time he had failed to use the outfit. (This doctor used to give on an average 400 prophylactic irrigations a day in his camp during the war, followed by calomel ointment. He was immensely impressed with the uniformly successful results, but he was keen enough to carry out the treatment under his own supervision.)

3. For three years had used Outfit B regularly and had no trouble. Last time he had not got it with him. Felt worried, so came up for examination. Found to be healthy.

4. Cured of venereal disease in 1912; Outfit B provided. Reports in 1922. For ten years he had used Outfit B. He had had no trouble whatever until one night he forgot to use it, being too drunk. That time he at once developed gonorrhoea. Was cured of that and returned to Outfit B, which he has used innumerable times. Despite this he developed in 1922 a chancre on the chin from the razor of a native barber. This is why he returned to see me.

5. A medical student used to go deliberately with women he knew had venereal disease, and used Outfit B afterwards. He never had any trouble. He persuaded several of his student friends to make the same experiment.

Certain of my students whom I had interested in the use of Outfit B went into the Navy during the war. Being keen men, they used to lecture to their men before they entered port and provide them with suitable outfits. They have informed me that they seldom had more than two or three cases of venereal disease in their ships, whereas neighbouring ships which did not use outfits had innumerable cases. The cases that did occur arose in those who had failed to use outfits. This illustrates the need for personal keenness and supervision, and above all for belief in the benefit to be obtained on the part of medical officers in the Services if packets are to be of any avail.

I have been prescribing outfits through my chemists for fourteen years, and so have other doctors who have been trained

by me. The sale is restricted because they can only be sold on a prescription and cannot be advertised, yet the demand increases. They go all over the world. It therefore seems to me a most unfair thing when interested bodies try to make out that packets if properly used are not efficacious. When one such body is willing to recommend soap and water, a measure it must know is not efficacious, and is unwilling to recommend a suitable and effective chemical agent, then its attitude appears to me not only to savour of hypocrisy but also of untruth. I have convinced myself in practice that packets if properly used are effective. It is foolish to deny this simply because you do not wish outfits to be used at all. If you wish to prohibit their use, do so upon moral grounds. No case is ever improved by trying to support it with statements that clearly are not true.

If, however, you ask me, will packets be properly used if introduced universally? then I think it is fair to say that in my opinion they will only be properly used in a certain percentage of cases. You are on firmer ground if you condemn packets on this count. The introduction of packets would save from venereal disease only the cunning and careful members of the community, and not the average daredevil occasional fornicator; for this reason they could never by themselves stamp out venereal disease.

Why would packets fail?

1. A great deal of civil promiscuity is unpremeditated. Therefore packets would not be available for unpremeditated cases. Many patients tell me this. I need not quote instances.

2. A fair amount is performed when drunk (perhaps 20 per cent.). A drunken man cannot use a packet. Many patients tell me this, particularly the college student who falls perhaps once a year only, after a dinner in honour of a football match or a boat race.

3. It is against the instincts of the average Englishman to go out properly provided with safeguards, and then look around for a girl. Things do not happen this way in the majority of cases. The type of man who goes regularly with the same girl is more inclined to use packets. If a man meeting a girl casually and stimulated to go with her were to begin to think the girl might harbour venereal disease, his emotion would change to that of disgust, and nothing would happen. The average young

man has the most pathetic faith in the cleanliness or purity of his inamorata. It is therefore impossible to expect him to use a packet. Next morning it is a different matter; he is willing then to come up and be treated, when he has come to his senses (see p. 146 below).

4. English people are extraordinarily stupid in carrying out a procedure according to a correct plan. Any rough plan is good enough for most of them. Chemicals are used, but either too weak to be effective, or so strong as to produce injury. They are too careless to get a proper packet, but many of them buy a syringe after going astray and syringe the next day with a chance chemical. If they could only be taught to select the right chemical, namely, 1 in 2000 potassium permanganate, they would effect a great deal.

INSTANCES

1. A naval man slept with a harlot three weeks before I saw him. He sprinkled a few permanganate crystals into a glass until the water appeared a faint pink, and used this to syringe his urethra. I found he was suffering from a mild and long-delayed gonococcal infection. (He should have used a strength of 1/2000, which is a dark purple. This would have been effective.) I have many instances of this fault, which I call 'permanganate crystal sprinkling'.

2. A man went with a woman fourteen days before. He used strong lysol for injecting afterwards. It burnt him, caused strangury and yellow discharge. Examination proved the discharge to be sterile. The whole thing cleared up without treatment.

3. A chemist's assistant after going astray injected for three weeks with 1/3000 corrosive sublimate. He developed a profuse and painful urethal discharge. This cleared up entirely directly he left off treatment.

4. A man bought an outfit and proceeded to use it before going out to meet a lady friend. This is a not uncommon mistake. He was disappointed when he developed urethritis.

5. A surgeon in the Navy some years ago, after going astray, used an injection of 1 part in 250 of corrosive sublimate in water. He had a terrible time. For a week afterwards he had to use cocaine every time he wanted to pass water, and he has had bladder irritation ever since. Examination showed multiple strictures. I have many instances of the dangerous effects of too strong corrosive sublimate. It usually leads to most troublesome strictures. Even a 1/20,000 solution may cause intense irritation, followed by stricture.

6. A man had used for years an injection of protargol after going astray. The last time he used it much stronger than usual and he developed a yellow discharge. Examination showed this was sterile. Left alone it disappeared spontaneously.

7. Many patients, getting frightened, buy a bottle of lysol and apply it to the outside. This produces painful burns, and they come along thinking they have got syphilis.

Packets, then, if used rightly, are found to be efficacious in a moderate number of instances. They would therefore be

efficacious in many instances *if used rightly*. The last three words are the crux of the matter. Would they be used rightly if advertised extensively? Would they even be used at all? I doubt it. I doubt if more than 5 per cent. of the population would ever take to packets. In the Services it is a different matter. There packets can be of avail, as they can be given out and lectured upon without offending ethics. In the Services the duty of keeping healthy for the fight outweighs all other duties.

I feel myself that chemists should be permitted to sell without prescription, and newspapers to advertise, certain types of packets duly examined, tested, and authorized by the Ministry of Health, but none other. These packets should also be sold at venereal clinics. By doing so you would prove in practice whether they were efficacious to any extent or not amongst a civil population. At first I should not expect packets to effect more than a 5 per cent. reduction in venereal disease. After ten years or so they might result in a larger reduction. I should not permit them to be sold in automatic machines, nor be given out promiscuously to all young men. Certain low-minded men, and women too, read certain papers of the baser sort. In these papers such advertisements could not harm the readers, and they might help to protect the community from vicious men and women, spreaders of disease.

Packets are often expensive, but they need not cost more than a few pence. They wear out in time, and should not be kept too long. They seldom irritate and can do no harm if they consist of proper materials. Certain individuals who drink and copulate to excess, and who keep on using packets too frequently, do sometimes develop a mild irritative staphylococcal urethritis by their use which is resistant to treatment, but which is no danger to themselves or others.

It is objected to packets that they may be used as treatment. I have not heard of an instance of it.

Packets have not had a fair trial in the Services, owing to the slackness and lack of real keenness on the part of the higher officers, reflecting itself in the work of the juniors. At one time in the Navy a good deal of use was made of a good packet called the 'Dreadnought'. When used properly by men instructed by keen officers, it was effective. Lately a substitute for the old

packet has been provided, which consists of 25 per cent. calomel ointment for injecting into the urethra as well as rubbing on the outside of the penis. This outfit was introduced by the Army authorities. It does not, in my opinion, prevent gonorrhoea and should therefore be abolished.

A Royal Naval lieutenant used a naval 'Dreadnought' of this type in Constantinople ten days before he consulted me. He had profuse gonococcal urethritis. He kept the 'Dreadnought' and I had it analysed. It consisted of about 25 per cent. calomel in lanoline.

I have other instances of the failure of this 'single' type of packet.

I would not, then, advise the giving out of packets to all young men on attaining puberty. The benefit to be gained by that course would be so small as entirely to be outweighed by the harm done to the morals of the nation in thus openly acknowledging free love for all.

DELAYED PROPHYLAXIS

So far I have discussed immediate prophylactic measures applied by the individual himself by means of a packet a short time after exposure (half-hour to two hours).

Delayed prophylaxis can be applied either by the individual himself the next morning or by a skilled and trained doctor or orderly.

The advantage of delayed prophylaxis is that it can be applied the next morning. There is no need for the man to be provided with a packet, he can go astray quite unpremeditatedly or when drunk. Yet when he comes to his senses *the next morning* it is still possible for him either to apply delayed measures himself or to apply to a skilled agent for them. I consider that English people are far more likely to take to this method than to a packet system, and it is one I advocate for adoption. You are not consenting to the sin in any way if you insist that persons who have run a risk should apply next day for treatment; you are simply taking steps to protect the community against disease. This type of prophylaxis is far more in accordance with the ideas of Englishmen. Later on it would be possible to punish those who did not avail themselves of such methods, by notification and even compulsory treatment in certain cases that kept repeating the offence.

For twelve years and longer I and my trained assistants and helpers have adopted the following routine for male patients who have been astray and who apply to us the next morning: They pass water. We then irrigate the anterior urethra with 2 pints of 1/2000 potassium permanganate at a three-foot pressure. We then rub in on the outside of the penis 33 per cent. calomel ointment. The patient is instructed to report again in three to four weeks' time if there is the slightest sign of a sore on the penis. If a syphilitic sore develops, it can usually be cured by three injections of 606 if treated within four weeks of the date of infection. So far we have never seen one of these cases develop syphilis.

I could give any number of cases where these measures have been used again and again, and have been uniformly successful. We have never had a failure. Space only permits me to quote a few as examples.

1. In 1910 I cured this patient of urethritis. He has attended my assistants on innumerable occasions since for delayed prophylaxis and has had further trouble only on one occasion, when he thought the girl so far above suspicion that he failed to take any of the usual measures. He promptly developed urethritis.

2. Cured many years ago of urethritis. Usually used Outfit B. From time to time if this is not available he calls for a prophylactic wash. Never any trouble.

3. For ten years has only failed to come up once for a wash after adventures, which have been numerous. On that occasion he got caught and developed gonorrhoea.

I could quote a large number of cases where men have applied only once or twice and the measures have proved efficacious.

I have convinced myself therefore that such measures of delayed prophylaxis are effective if carried out the following morning correctly by a trained worker. It is a matter of little difficulty to train an orderly to carry out these manipulations correctly and without harm resulting.

In March 1916 I gave to this method the name of 'Early Treatment', and, encouraged by Surgeon-General Jones of the Canadian Army, I tried to get it adopted for soldiers coming on leave to London, under the auspices of the N.C.C.V.D. and the National Guard. I introduced the subject in a speech at a Mansion House luncheon on April 19, 1916, at which the Colonial Premiers were present. The Colonial troops took up the method with energy, and effected a great deal with it at their English camps. The scheme failed for the English troops,

because the Army authorities gave no effective encouragement, and also because I could not persuade more than a small number of hospital committees to take any interest in the scheme.

Those soldiers who applied to us at the London Hospital got their treatment and benefited from it, and the same was true of the Hospital of St. Paul's, where many New Zealanders applied and were treated by Dr. Malcolm Simpson. I called this method 'Early Treatment' because no one would look at it at all except under a camouflaged title. Such is our English hypocrisy. I call attention to this early attempt, as much can be learnt from failure of early efforts if we study the causes.

I am strongly of opinion that a very great diminution could be obtained in a few years in the incidence of venereal diseases *in the larger towns* if this method of delayed prophylaxis or 'Early Treatment' were to be adopted by the Ministry of Health. For a number of years I have urged this step.

My scheme is as follows:

Make use of the copious supply of public urinals provided in towns, and co-ordinate them with the venereal clinics established in so many towns. Venereal clinics can never stamp out gonorrhoea simply by treatment of established cases. They are of service in that in them an increasing number of doctors obtain some special knowledge of venereal disease. But they will never justify their establishment and expense until they are made centres for instructing the public in the possibility of delayed prophylaxis, and in being used for that purpose.

In all urinals and in all venereal clinics some such notice as this should be put up:

SAFETY FIRST

Not for yourself alone, but for the sake of innocent women and children.

If you have been foolish and have risked your health with a woman, do not delay; you may have sown the seeds of disease. Apply the *very next morning* to the nearest venereal clinic (address given) or to your doctor, and ask for 'Early Treatment'. It is not too late even the next morning for a single treatment to be applied which will eradicate the seeds of disease and prevent its development.

The Ministry of Health should approach all the hospitals at which venereal clinics have been established, and should insist that adequate early treatment centres should be attached thereto. At present lay committees refuse to consider such a matter. I offered to establish and run such a centre at the London Hospital some years ago, but my offers were all met with firm refusal on the part of the authorities. Speaking as a hospital surgeon and one who knows the ropes, I can state confidently that there is no practical difficulty whatever as far as the medical staff of the venereal clinic is concerned in running an early treatment centre attached to the clinic or to the receiving-room. The lay committees are frightened to touch such a matter, as they are afraid that a lot of old ladies would withdraw their subscriptions. That is one of the many disadvantages of hospitals dependent on charity. They dare not do many things for fear of offending subscribers.

The Ministry of Health should see to it that all students and doctors give evidence of having attended a course of elementary instruction in venereal disease, and especially in prophylaxis. At present the majority of doctors would not have an accurate knowledge of what exactly to do to a patient who applied the morning after a night out, and asked to be ensured against venereal disease. Not one examiner in ten could answer such a question accurately, or carry out the necessary manipulations adequately. The neglect of compulsory teaching on venereal diseases in the teaching hospitals remains an open scandal.

Even if a man delays for two or three days to apply for early treatment, a 1/2000 permanganate wash even at that interval may prevent gonorrhoea.

Again, if a man were to apply, because of the notice, a few days after he had been astray instead of the very next day, and if he had developed early gonorrhoea, it would even then be possible in the majority of cases to abort the disease with a week's treatment. So that for this reason alone such notices would justify themselves, and also they would bring up many cases of syphilis in the early, easily cured stages.

PERSONAL DELAYED PROPHYLAXIS

Many patients of mine and of my assistants are taught when suffering from urethritis to irrigate their own urethras, using an india-rubber bag or tin and a special urethral nozzle. They obtain these from my instrument maker (J. H. Montague, 69 New Bond Street, W.1) as an irrigating outfit with printed directions attached.

When they are cured we consider it part of our duty to tell them to keep the outfit and use it whenever they go with a woman. It is to be used next morning, and they must be careful to use an irrigation of potassium permanganate of exactly the right strength, namely, 1 part in 2000 of water. Many of our patients have used this method for years with unfailing success. So successful has this method been that we recommend it now in preference to recommending Outfit B. The bag is easily carried about. Permanganate can be obtained anywhere. These bags are used by our patients all over the world.

1. Applied to me in 1922 for other troubles. He told me that for more than ten years he has used my irrigating bag as directed after connexion with women. It has never failed.

2. Seen by me in 1917; method taught. Seen again 1921. Has used it constantly with success.

I could quote any number of similar cases.

Even if a man has not got such a bag handy he can insure against gonorrhoea by injecting his urethra several times with 1/2000 potassium permanganate within twelve hours of exposure. These materials can be obtained from any chemist. All chemists ought to know the right strength, so ought all doctors. Unfortunately such knowledge is often lacking.

PROPHYLAXIS IN WOMEN

Very little attention has been paid to this part of the subject.

Personal Prophylaxis

Prostitutes take more care to avoid venereal disease than amateurs, as they fear to lose their market value. Nevertheless, in time they are bound to get caught, either because they grow careless or because of drunkenness.

It is a difficult matter to get much information out of these women, but I gather that they are very cute at making a rough

inspection of a man. They often persuade him to wear a condom. This is not always a protection, as it often breaks. A number of these women rise after the act and employ a vaginal douche. This may prevent cervical infection, but I do not know that it always prevents urethral infection. As far as I can gather this is the extent of their efforts.

ILLUSTRATIVE CASE

Male seen in 1916. He has had a chronic relapsing proved gonococcal urethritis accompanied by joint troubles ever since 1903 and knows it. Yet he has cohabited regularly during these years with his wife and one other woman. These two always douche with permanganate afterwards and have never developed disease.

I venture to suggest the following methods of personal prophylaxis in women as worthy of your consideration:

1. A prostitute should be advised to keep calomel 33 per cent. in lanoline in a tin squeezer tube. If this were used as a lubricant it might diminish a lot of syphilis.

2. It should be pointed out that a condom usually gives protection, but if it breaks other measures are needed. Men may develop chancres above the limits of a condom; I have seen this. The condom may burst and infection follow. A man may infect himself from his fingers after taking off the condom or from washing in an infected utensil.

3. A pessary inserted a few minutes previous to the act might give a fair degree of protection both against pregnancy and disease. This might consist of 5 grains of sulphate of quinine, one-hundredth of a grain of corrosive sublimate, 15 grains of the oil of theobroma, put up in silverfoil to keep it clean. Chemists should be allowed to sell this and state what it is for.

4. The practice of douching after the act helps to prevent impregnation, and undoubtedly diminishes the risk of venereal disease. A suitable douche is 1 part in 2000 of potassium permanganate. Possibly a drachm of lysol to a pint of water would also be effective.

5. If a prostitute wishes to make sure of avoiding disease I feel sure the following steps would be a certain safeguard. She should use calomel 33 per cent. in lanoline ointment as a lubricant *to prevent syphilis*. Within half an hour of the act she should douche the vagina and vulva with 1 part in 2000 potassium permanganate. This should *prevent cervical infection*.

Next morning at her leisure she should douche out her urethra and bladder with a similar solution. Women can quickly learn to carry out this manipulation. They need a douche tin and a special glass urethral nozzle which I have designed and used for five years in my department at the London Hospital. First they pass water. Then sitting with a mirror in front of them they can see the urethra and so introduce the nozzle into it. After douching the urethra they allow the nozzle to glide into the bladder and fill the bladder with lotion. They withdraw the nozzle and then pass the lotion out of the bladder just as if they were passing water. Such a urethral wash should seldom if ever fail to *prevent urethral infection.*

As much if not more promiscuous intercourse is carried out by amateurs as by prostitutes at the present day. Amateurs are usually both ignorant and careless. They are never faithful to one man, a fact the average male cannot be persuaded to believe. They are therefore nearly all infectious.

It is difficult to suggest measures to help the amateur. She usually dreads pregnancy more than she dreads disease. She might therefore be willing and able to use the pessary of quinine and corrosive sublimate suggested above, as it has a double effect. Dreading pregnancy, she often insists on the use of a condom, but, as I have said, that is a very fragile and uncertain protection. She might carry calomel ointment in a metal squeezer tube to be used as a lubricant. For her, delayed prophylaxis by a skilled agent is more likely to be efficacious, though I doubt if it is practicable on a large scale. She could learn to irrigate her own urethra and vagina as suggested above.

DELAYED SKILLED PROPHYLAXIS FOR WOMEN

Were I faced with the problem of a woman coming to consult me the morning after she had had intercourse and wishing to make sure of avoiding venereal disease, I could only guarantee safety by adopting the following measures:

Having passed water, she would be mounted on a urological chair with legs apart. I should douche out the urethra and bladder with 1/2000 potassium permanganate, using my urethral nozzle. I should then expose the cervix with a duck-bill speculum and head-light. I should swab out the cervical canal with 1 part of acriflavine in 50 parts of salt solution. I should

then paint the walls of the vagina and vulva with the same solution as I withdrew my speculum. These measures would invariably prevent gonorrhoea.

As regards syphilis, the only way to ensure that syphilis should not follow would be to give 0·6 of a gramme of novarsenobenzol into a vein straight away. This should prevent syphilis.

A certain amount of delayed prophylaxis for women might be carried out at the venereal clinics, but I doubt if very many cases would be dealt with, owing to the time involved. In the case of the male it is a different matter, as a man can be dealt with in three minutes. Nevertheless, a lot might be effected by letting prostitutes know that personal prophylaxis in women is possible and advisable.

CHAPTER XIII

RECENT ADVANCES IN TECHNIQUE

Since the appearance of our first edition Dr. Malcolm Simpson has been carrying out the diagnosis and treatment of gonorrhoea in women and female children, not only at the London Hospital but in private practice. His ever-increasing experience has shown that the original lines on which we worked were soundly laid. The chief progress made has lain in this, that he has been able to speed up very considerably the time needed for cure, particularly in private practice where it is possible to treat the patients every day in selected cases. Such cases can often be cured in a remarkably short space of time. The secret is to know what to do and to do it quickly and often. Certain refinements and extensions have also been made, but the main lines of treatment remain the same and are effective in practice. In considering a new edition it was not found necessary to change a single word of the first edition, but it has been thought advisable to add a new chapter outlining the chief improvements that have been adopted.

URETHRITIS

Dilatation of the Urethra (p. 56).

Unless there is very acute pain or haematuria we now treat early acute gonococcal urethritis by means of dilatation. Short straight nickel-plated or rustless steel bougies are used calibrated from 20 to 30 Charrière and lubricated with 'lubafax'. These are passed twice a week in increasing sizes. Before passing the dilators we introduce a glass catheter into the bladder, empty it and then fill it with a solution of 1 in 5000 acriflavine. After passing the dilators we ask the patient to micturate, and in this way she flushes out the urethra with the antiseptic lotion. On the other five days of the week a nurse or the patient herself irrigates the urethra and bladder with a solution of potassium permanganate 1 in 4000. Such dilatations are often followed the next day by the passage of urine containing a deep haze of pus, sometimes accompanied by a little pain and increased frequency. This haze clears up if the patient is given four to six

'tabloids' of hexamine and methylene blue daily for a day or two.

Urethral Paintings.

When the acute urethritis has subsided and if the disease has become chronic the dilatations are continued, but a further effective method of treatment has been elaborated by one of

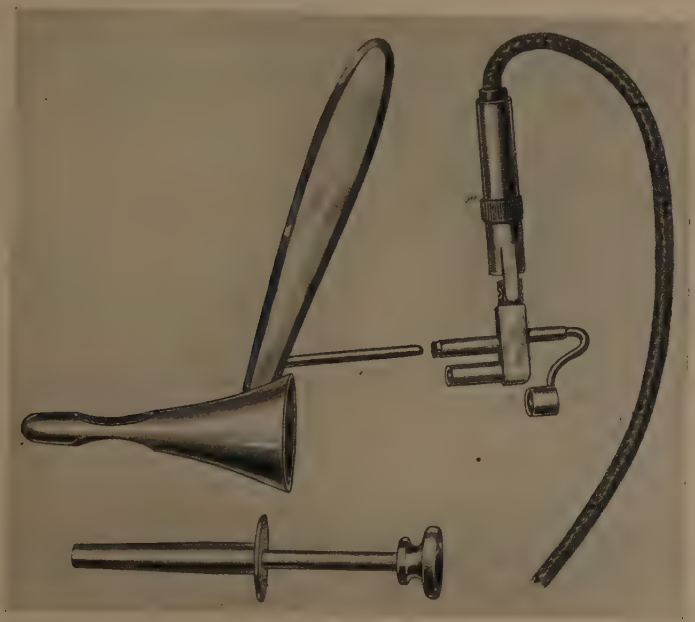

Fig. 10. Urethroscope and tube for painting floor and roof.

us (F. K.). A catheter is passed, the bladder emptied and filled with 1 in 4000 oxycyanide of mercury solution and the catheter withdrawn. A new form of urethroscope tube (Figs. 10 and 11) is lubricated and introduced as far as it will go through the urethra into the neck of the bladder. The obturator is removed, the lighting arrangement swung into place, and there is now exhibited the front portion of the trigone and the back portion of the floor of the deep urethra. The stop on the tube prevents any urine from escaping. The reddened inflamed floor of the urethra and bladder is now dried with a stickhead cotton-wool mop and painted with a small camel's-hair brush dipped in

silver nitrate 80 grains to the ounce. The painting is continued along the floor of the urethra forwards as the tube is gradually withdrawn. In this way the urethra is painted with very strong silver nitrate and yet the patient experiences remarkably little pain or inconvenience. This procedure may

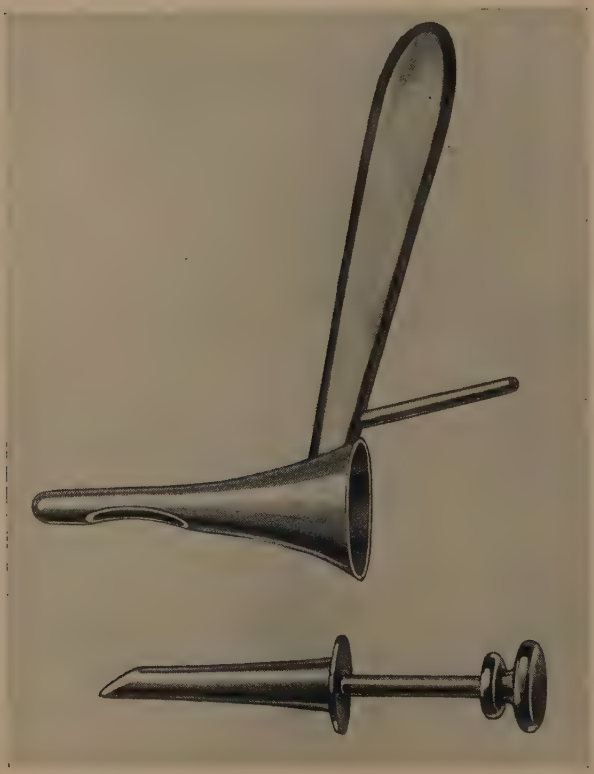

Fig. 11. Urethroscope tube for painting floor only.

cause a little bleeding which is of no moment, but is wonderfully successful in clearing up quickly a chronic urethritis. (The same procedure has been found most effective in clearing up chronic trigonitis and urethritis due to colon bacillus infections and in curing increased frequency of micturition in such cases. This process may also be followed by the same temporary haze mentioned above, which is relieved in the same manner by hexamine and methylene blue.)

CERVICITIS (p. 66)

Acriflavine 2 per cent. in Glycerine in the Treatment of Cervicitis.

Dr. Dwyer, working at the London Hospital, suggested that acriflavine 2 per cent. in glycerine might prove more efficacious as a cervical paint than acriflavine 2 per cent. in salt solution. The suggestion has been adopted and gives improved results as the glycerine appears to produce a copious flow of fresh muco-pus from the cervical canal.

Gonococcal Cervicitis

Dr. Simpson has been able to distinguish four main clinical types, two in acute and two in chronic cases.

Acute Cervicitis.

(1) Acute Infection of a Nulliparous Cervix. This is characterized by a red angry areola with marked oedema surrounding a sharp cut circular external os from the centre of which yellow pus pours forth.

(2) Acute Infection of a Multiparous Cervix. This is characterized by a more subdued and less oedematous irregular ring of inflammation surrounding an irregularly torn cervix containing an old chronic erosion oozing forth yellow tenacious pus.

Chronic Cervicitis.

(1) The first type shows a well-marked chronic erosion, with or without an accompanying tear of the cervix as the result of labour or some operation, and with *thin muco-pus* issuing from the cervical canal.

(2) The second type shows an apparently healthy-looking cervix with no erosion, or a cervix with a pale erosion and a tear, but *clear jelly-like mucus free from pus is seen issuing from the canal. This mucus yields a pure culture of the gonococcus.*

In Dr. Simpson's experience the prognosis can be based to a large extent on these types as seen clinically, although the observer must always be careful to take into account the possibility of pelvic complications as shown by a history of abdominal pain, fever, and menorrhagia, with tenderness in the lower abdomen on palpation, and in one or both vaginal fornices on bi-manual examination. That is to say, the prognosis is based

(1) on the history of pain, fever, and menorrhagia, (2) on the clinical signs.

PROGNOSIS

Acute Cervicitis.—In acute cervicitis with no deep pelvic complications:

Type 1. Here the prognosis is good and a cure can be effected in one to two months, or even more quickly if the treatment advised is carefully carried out.

Type 2. In this condition there is a tear and often considerable scar tissue, and the prognosis is therefore not so good. It is much more difficult to clean out the cervical canal properly and to get good drainage, and the case usually takes three to six months to cure unless treated by dilatations as advised below.

Chronic Cervicitis.—In chronic cervicitis with no apparent deep pelvic complications:

Type 1. The prognosis is good though the treatment is more tedious and needs to be somewhat more drastic than in the acute cervicitis of type 1.

Type 2. The prognosis here is not good. Although the discharge from the cervix appears healthy, the cultures show gonococci. The appropriate treatment is given and the cultures become negative, but on stopping treatment the cultures soon become positive again. This happens over and over again. The clinical appearance of the cervix and of the mucoid secretion appears persistently healthy but the cultures from the mucus grow gonococci repeatedly or at frequent intervals. In this relapsing type of case, on fresh and careful scrutiny there nearly always turns out to be a very obscure history of deep pelvic trouble and very indefinite physical signs indicative of infected tubes. The history and signs have been so very indefinite that the real source of infection has been missed, namely a mild infection of the Fallopian tubes. This needs remedying before a cure can be obtained.

TREATMENT

Just as these types differ in clinical details and in prognosis, so do they require different lines of treatment.

Acute Cervicitis.

In hyper-acute cases, so tender are the parts involved that a natural subsidence of the inflammation must be awaited before

active treatment can be carried out. Under these circumstances repeated hip-baths of hot salt solution are advised. But in the ordinary acute cases Dr. Simpson has found nothing but good attend his efforts in applying antiseptics to the cervix during the acute stages. Unfortunately in hospital treatment he cannot find the time to do so more frequently than twice a week, but in private cases he has dealt with the cervicitis by daily swabbing, and a cure has sometimes been attained in a week or ten days. *Provided there are no signs of acute pelvic involvement, the treatment of acute cervicitis type 1 can be carried out daily as a routine measure.*

Type 1. The vulva is first swabbed dry and then a Cusco's bi-valve speculum is inserted and the cervix exposed. The excess of discharge from the cervix is swabbed away with wool held in sponge holders, a Playfair's probe covered with sterile cotton wool is then gently twisted into the cervical canal to remove the ropy tenacious pus which covers it. This is repeated, and if unsuccessful egg-whisk forceps should be used, or the cervical canal should be soaked with liquor potassae 1 in 5. The most essential part of the treatment is to get rid of the tenacious mucoid pus before applying antiseptics to the bare mucous membrane. A mop of wool on a Playfair's probe is then dipped in a solution of 2 per cent. acriflavine in glycerine and applied deep into the cervical canal as far as the internal os two or three times. The patient is tipped well backwards and then a full test-tube of acriflavine in glycerine solution is poured into the vaginal canal and allowed to flow back into the cervix. A tampon with tape attached is then soaked in the flavine, placed against the internal os and left for 24 hours, to be removed by the patient herself. On removal the patient washes away the excess of flavine by means of a hot saline douche. *This application can be repeated daily without any toxic effects and without causing irritation.* In those few cases where we have found irritation they have always been in the hyper-acute stages, and here use is made of a 10 per cent. solution of eucalyptus oil in sterile olive oil, or if the irritation is very intense calamine liniment only is used for a few days. This has a well-marked sedative action, and as soon as the hyper-acute stage is over a return is made to the acriflavine.

Type 2. In the acute cervicitis type 2 with scar tissue and

poor drainage there is usually a pocket of pus held up by scar tissue just in front of the internal os, that is to say, in the deeper portion of the cervical canal. This needs more drastic treatment. The patient is placed in the Kelly's position, the vulva and vagina are cleaned out with acriflavine in glycerine, and then the cervix is dilated very carefully up to No. 8 Hegar, the instrument being passed through the internal os. Generally a sudden gush of pus is seen as the dilator is withdrawn. After this has been swabbed away a smaller Hegar, say No. 4, is passed up the canal and moved gently up and down whilst the vagina is filled with acriflavine solution. This allows the solution to penetrate deeply into the whole of the cervical canal. This often effects a rapid cure in cases which have proved resistant to the ordinary swabbing out of the canal without any dilatation. In all these cases there was no history of menorrhagia, abdominal pain, or fever, and no signs indicating an inflamed tube.

The dilatation of the internal os appears to provide the necessary drainage to a pocket of pus held up behind scar tissue, as evidenced by the gush of pus seen on withdrawal of the dilator and by the fact that the condition rapidly clears up on repeating these dilatations at intervals of three to four days. In between the dilatation treatments the cervical canal is swabbed daily in the usual manner.

Chronic Cervicitis.

Type 1. In the treatment of chronic cervicitis, type 1, that is to say either in the acute cases that have failed to clear up completely by the flavine treatment or in the cases that apply for treatment in the chronic stages, strong antiseptics can be applied to the cervical canal of a caustic nature that are able to soak into the cervical glands and also to destroy to a limited extent the surface of the mucous membrane. In these cases the cervix is exposed as before, and the tenacious purulent mucus which is harder to remove in chronic than in acute cases is removed by egg-whisk forceps or liquor potassae. Before completing the cleaning-out process gently squeeze the lips of the cervix between the blades of a speculum or a sponge-holder forceps. This seems to stimulate the cervical glands to pour forth an excess of secretion and so washes them out with fresh

tissue juices, a procedure analogous to the process of massage of the prostate, which is so successful in the treatment of infected males. It encourages tissue interchange, unblocks the ducts and empties the deep glands. When the cervix is dried of all secretions silver nitrate is applied in strengths of 30, 40, 50, and finally, 60 grains to the ounce of distilled water on successive occasions. The silver is at once neutralized by an application of tincture of iodine which is left in the canal. This painting is performed twice a week as a rule. Alternative applications are a saturated solution of picric acid in spiritus vini rect., iodized phenol (B.P.), pure ichthyol, or formalin 40 per cent. Their application should not be adopted until four weeks have elapsed from the inception of the disease. The length of time needed to cure a case with bi-weekly treatments is about twelve weeks. If there is much scar tissue it may be necessary to dilate the internal os by the method described in the treatment of acute cervicitis.

The following methods have been employed in resistant cases:

(1) Gentle dilatation of the external os by means of Hegar's dilators, followed by strong paintings as mentioned.

(2) A method recommended by Dr. Remington Hobbs of St. Mary Abbott's Hospital, namely the insertion into the cervical canal of a gauze tampon soaked in linimentum iodi three parts, glycerine one part, and left *in situ* for six hours.

(3) Administration of anaesthesia. The cervical canal is dilated as far as the internal os up to No. 10 Hegar. The cervical mucous membrane is gently and superficially scraped with a Volkmann's spoon. The canal is painted with silver nitrate 80 grains to the ounce of distilled water.

(4) Suction (see Figs. 12 and 13). A fenestrated metal tube is passed into the cervical canal, rubber tubing is passed over that until it impinges against the cervix. A sucking syringe is attached to the metal tube, the cervical discharge thoroughly sucked out, after which acriflavine 2 per cent. in gylcerine is applied to the canal. These tubes were invented by Dr. Pedroso, who worked in the department, and are very effective.

(5) Diathermy as elaborated by Drs. Cumberbatch and Robinson of St. Bartholomew's Hospital.

(6) Amputation of the cervix. This is advised when all the

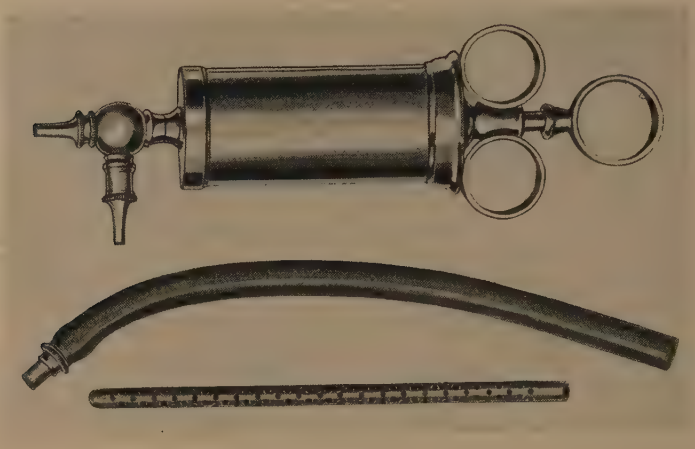

FIG. 12. Pedroso's sucker.

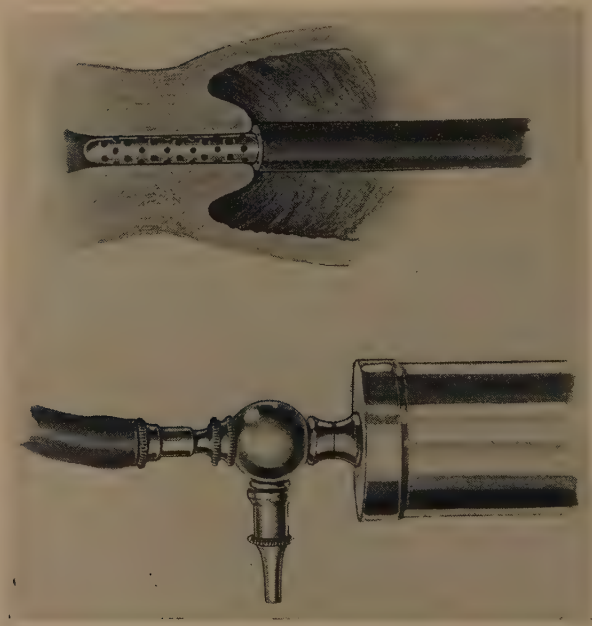

FIG. 13. To show the sucker applied to the cervix.

other measures properly carried out fail to rid the cervix of gonococci. It is very seldom required.

All treatment applied to the cervix, both in acute and chronic cases, should obviously be discontinued during the menstrual period and the patient urged to rest in bed at these times.

Chronic Type 2. In these cases where there is so often an indefinite history of acute or sub-acute endo-metritis and salpingitis, experience has shown that all the methods just described are of little or no avail. Under these circumstances a method is employed as recommended by Dr. Remington Hobbs of washing out the uterus with iodized glycerine. This should only be done under full aseptic technique, the patient being admitted to hospital first and prepared for two days. The vulva and vagina are cleaned out with equal parts of glycerine and iodine. On the second morning, under general anaesthesia, the patient is placed in the dorsal position and Auvard's weighted trough speculum, or Sim's speculum used. An assistant holds up the anterior retractor over the anterior wall of the vagina, and using Dr. Hobbs's special catheter introducer (see Fig. 14) a No. 5, 6, or 7 English rubber catheter without a lateral eye, lubricated with 'lubafax', is introduced into the cervix through the internal os, until it lies well inside the cavity of the uterus. Should the internal os be narrowed it must first be dilated by a No. 7 Hegar. To the catheter is attached a 10 c.c. Record syringe, and 10 c.c. of antiseptic fluid is injected into the uterus. Any excess flows around the catheter. Dr. Hobbs uses an aqueous solution of iodine one part, glycerine seven parts. It is most important to suck out any excess of fluid with the syringe so as to leave the uterus empty and thus avoid painful uterine complications. The catheter is left *in situ* for six hours. If necessary the treatment can be repeated. In a number of cases a cure has been effected by this last method and the cultures have become permanently negative. The abdominal symptoms clear up, the menstrual periods become normal, and nothing abnormal can any longer be felt on pelvic examination. In some of the cases, however, it is found that the infection of the cervical mucosa persists in spite of this treatment. Before resorting to operation and removal of the infected tube or tubes and uterus, Rubin's air perflation, or the lipiodol X-ray test are employed as described below, in order to investigate the

FIG. 14. Dr. Hobbs's uterine catheter and introducer.

patency or otherwise of the tubes. If they are patent the above treatment is persisted in, if they are blocked operative interference is advised.

Apparatus for the Irrigation of the Urethra and Vagina in Children (p. 94)

Dr. Broadbridge working in the department at the London Hospital has designed a useful type of syringe and metal cannula, one for the urethra and one for the vagina for the treatment of vulvo-vaginitis in children. Acriflavine or silver nitrate solutions or Bulgarian milk and castor sugar can be applied with this apparatus and it insures thorough application of the solutions to the mucous membrane of the urethra and vagina. They are made by J. H. Montague, 69 New Bond Street, London, W.1. who also supplies a leaflet describing the uses of the apparatus.

Bulgarian Milk and Castor Sugar in the Treatment of Vulvo-vaginitis

In gonococcal vulvo-vaginitis in children we are now employing as a daily treatment by the nurse a douche of sodium bicarbonate one drachm to the pint, followed by the filling up of the vagina with a paste made of Bulgarian milk and castor sugar, equal parts of each. This is injected with a syringe to which is attached a rubber catheter or with Dr. Broadbridge's apparatus. The viscous paste is left in the vagina and is applied to the vulva as well. This treatment is used as the daily intermediate treatment between the bi-weekly applications of acriflavine 2 per cent. in glycerine to the vagina, and silver nitrate to the urethra.

Injections in Gonorrhoeal Rheumatism

In addition to the focal treatment and the local treatment of the joint, we have tried the following general measures in gonococcal rheumatism:

Intravenous injections twice a week of Iodaseptine (Anglo-French Drug Co.).

Intramuscular injections at four days' intervals of sterilized milk 2 c.c., 5 c.c., 7·5 c.c., and 10 c.c., or of Aolan (Beiersdorf).

Intramuscular injections of Yatren-Casein, 2 c.c. at intervals of two days in the acute cases and 0·5 to 1 c.c. at intervals of four days in the chronic cases. There is no general reaction when this is given, but there is usually a temporary exacerbation of the arthritis following the injections.

We have not employed vaccines, either autogenous or detoxicated, but we have tried an intravenous vaccine called Gono-Yatren.

Treatment of Soft Sore (p. 32)

In cases of soft sore, especially if there is phagedaena, surgical diathermy to the edge and base of the sore has been used with success in preference to the method of the actual cautery or the acid nitrate of mercury. *As a general measure intramuscular injections of intramine 3 to 5 c.c. at intervals of four days have proved of most avail.* [We have also tried intravenous injections of Dmelcos, as supplied by May & Baker, which is a stabilized emulsion of Ducrey's bacillus, in doses of 0·5, 1, 1·5, 2, 2·5 and 3 c.c., each injection being given at an interval of three to four days and being usually followed by a general reaction. Terpíchín injected intramuscularly every other day in doses of 1 c.c., as supplied by Zimmerman, has also been found helpful.] Nevertheless, we advise the immediate employment of intramine as the first line of attack in all cases. After the diathermy treatment we have found the most useful application to be sterile lint soaked in a solution of copper sulphate two grains to the ounce of water.

Examination of the Fallopian Tubes by Lipiodol and X-rays

Lipiodol is opaque to the X-rays. It is fluid and passes easily into the narrowest tubes. It is harmless, is absorbed very slowly, and has a slight antiseptic action. The instrument used for the purpose consists of a syringe and metal cannula. The process is viewed under the fluorescent screen.

It is sufficient to fill the uterus with lipiodol, the muscular action of this organ propelling the fluid along the tubes, providing the os uteri is kept occluded. This is secured by using a sound which fits tightly into the cervix, the cervix if necessary being clamped round it with a volsellum. The fluid can be seen on the screen passing through the tube and into the peri-

toneal cavity. By this method it is possible to diagnose if there is a block of the tube. Nevertheless, it has been our experience that in some cases where the tube has thus been shown to be patent there has eventually proved to be a gonococcal infection of the mucous membrane of the tubes without stenosis and without a true pyosalpinx.

Primary Chancres in Women

The types of primary chancre in women are:

1. Multiple transient small superficial sores with but little induration, a sharp cut margin with a smooth red base, seen nearly always on the labia or fourchette.

2. The cauliflower chancre with an indurated ulcer, often seen at the meatus urinarius, and simulating carcinoma.

3. Chancre d'Emblée which occurs sometimes when spirochaetes are inoculated on columnar epithelium.

4. Non-inflammatory or cold oedema of one labium or the cervix, no ulcer being seen. This condition, especially on the cervix, is almost diagnostic of a primary chanchre.

Diphtheria of the Vulva in a Child

One child came up to the department presenting an ulcer of the vulva covered by a yellowish white adherent membrane. As the child had also well-marked laryngeal stridor an examination of the ulcer for the Klebs-Loeffler bacillus was made. It was found to be present and appropriate serum treatment was given with success.

APPENDIX

Analysis of 650 Consecutive Cases examined at the Female Gonorrhoea Section of the Venereal Clinic of the London Hospital, 1917–20.

The following figures were obtained by an analysis of the notes taken on the out-patient cards (see pp. 2 and 3) of the first 650 cases that attended the clinic from its inception in 1917. Had we waited and taken the cases from 1919–23 we should have shown a more favourable time of cure, as we found that as we progressed we learnt new facts that helped us to lessen the time of treatment. We also learnt to be able to make a more accurate diagnosis by clinical appearances alone, such as was not possible without complete bacteriological checking in the earlier stages of our study. We also learnt many facts of interest from close study of private cases, in which the end-results could be more closely and minutely followed up. These lessons have been incorporated in the text of the book. Nevertheless we thought it would be most valuable if we analysed our first lot of cases, as it would show what could be done even by men who had little previous special knowledge of gonorrhoea in women, and who were prepared to sit down and teach themselves. Clinical facts and knowledge can never be reduced to mere mathematical formulae. But we find it is of help to take a series of carefully observed cases and to add up the relative number of observed phenomena. This acts as a valuable check on clinical enthusiasm. Without such a study one is apt to remember the most striking phenomena, and to exaggerate the commonness of their occurrence. One is also apt to live in the present with its large series of attending uncured cases, and not to realize that all the time cases are being turned out as cured. It is therefore a great encouragement to realize that definite results are being obtained, and in what proportion to the total number of cases seen. It is also of great value to know what kind of complication is common and what uncommon, and, therefore, not to be in too great a hurry to make a diagnosis of an uncommon complication without careful checking. The figures given below are simply meant to give a rough approximation so as to present a mental picture

of what is common and what is uncommon, and as to what are common causes of certain symptoms and as to what are very rare causes. Nothing more is claimed for them than this, which, however, is of considerable educative value.

The department soon became a clearing or sorting house for women who came up to the receiving-room of the hospital and complained of leucorrhoea or painful micturition. The receiving officers themselves, often working as clinical assistants in our department, soon learnt that in this department their cases, when sent down, would receive an extremely careful and minute examination, and that they could thereby learn a great deal to help them in practice.

From 1917 to 1920, 650 women and female children were passed through the department. Some of the children were on the borderland between childhood and adult life (12 to 15). For this reason a few became included in the list of both adults and children for purposes of analysis. This explains a slight discrepancy to be observed in the figures. Two hundred and twenty-three cases of proved gonorrhoea occurred amongst adults and grown-up children, fifty cases of gonococcal and non-gonococcal vaginitis occurred in children and young adults; 382 cases came up that were proved not to be suffering from gonorrhoea at all, but from vaginal discharge due to a variety of other causes.

Out of 223 cases of proved gonorrhoea in adults and grown-up children, in thirty-seven it was proved that the husband had gonorrhoea, and this was why the woman applied for examination. Hardly one of these women was a professional prostitute. They do not attend our department; why, I know not. Most were respectable married women or single girls who had gone astray. In only one case was a lavatory accused, which shows that this is a fanciful and unlikely cause of infection. In twenty gonococcal cases the women were also suffering from syphilis, and in all such cases the woman was at once referred to the department for syphilis, as I consider it dangerous for the nurses and doctors and other patients, if patients with active syphilis are to be treated for gonorrhoea at the same time. Gonorrhoea can wait and be treated at any time, syphilis cannot wait and demands intensive treatment at the earliest possible moment.

One girl stated that she was chloroformed and raped; we attach no credence to this story. Another stated that she had taken wine with a man, and this was her excuse. Only three cases came up because of 'baby's eyes'. They were all quite correct; they had got gonorrhoea and had given it to their babies. This shows how uncommon gonorrhoeal ophthalmia is becoming, thanks chiefly to the adoption of prophylactic treatment applied to the eyes of children immediately after birth. Twenty-one infected women were also pregnant. Nothing can be more pathetic than the cases of these poor girls, often of respectable upbringing, who have given way to their lovers. It has been a matter of great difficulty to get these cases taken into any proper maternity home, as many such homes will not admit the diseased even when they will admit the 'unlawfully pregnant'. Thanks to our Lady Almoner, we managed to find homes for most of them, where we were able to carry out treatment during pregnancy. Latterly we have been able to get them into the Lock Hospital, under Miss Basden, formerly one of our chief assistants. It is then quite feasible to bring about cure before parturition takes place, which prevents infection of the tubes as well as ophthalmia in the offspring.

As regards family life, quite a number of families came up to the department where father or mother and several of the children were suffering from gonorrhoea; for instance, husband and several children, or mother and several children, and in one case three children from one family who had played with a child infected from another family. It has been most interesting work curing the father, mother, and several children in one family, and getting the family happy and contented again. These family infections appear to rise from the fact that the family often sleeps in one bed and uses common towel, sponge, and soap.

Only two of these cases admitted to having 'loved a soldier', so that the outcry of 'the brutal and licentious soldiery' and 'war babies' is shown, on our experience, to be largely a bugbear invented by a specious press. The crowd was no more and no less immoral during the war than before or after. The amount of promiscuity amongst a population seems to remain a very constant factor at all times, and only seems to increase during periods of religious revivals.

Amongst young girls there were only two cases of proved rape or precocious intercourse. Most of the childhood disease appears to be acquired through unhealthy family conditions.

One girl aged nine had been raped and infected, another of six had been raped and infected with both gonorrhoea and syphilis. Otherwise there were no accusations of rape amongst the children.

When we started we hoped that we should have the opportunity of seeing a number of primary chancres of the cervix, but as a matter of fact in 650 cases we were only able to detect four cases of undoubted chancre of the cervix. These presented a typical appearance, and scrapings revealed the *Spironema pallidum*, the blood reaction being negative. They were submitted to intensive treatment and rapidly cured of syphilis. We saw a few cases of chancre of the labium majus, but out of forty-four cases of syphilis detected in 650 cases, it was in less than 20 per cent. that we were able to find the primary lesion.

Two Hundred and Twenty-Three Cases of Gonorrhoea in Adults. Number of Cures

As regards the percentage of cures, we found that eighty-four cases were only seen once or a few times and then failed to attend any further—that is to say, 37 per cent. of the cases. This is a fine tribute to the powers of persuasion and propaganda on the part of the department. The figure of failures to attend in all the out-patient departments is just over 50 per cent., so that we were able to beat most other departments in persuading our patients of the importance of regular attendance till cure was obtained. Of this number 8 per cent. failed to attend again because they were sent to the department for syphilis and were not sent back again.

Thirty cases (13 per cent.) attended regularly until they had become apparent cures—that is to say, they had lost all their symptoms and all their films were completely negative. They simply failed to attend for our final ideal bacteriological culture tests. The majority of these were in all probability cured.

One hundred and twelve cases (50 per cent.) attended to the bitter end, and went through their three final cultural tests with negative results and were proved cured. It was found that

the average time to obtain an apparent cure was ten weeks, and towards the end that average was brought down to eight weeks—that is to say, sixteen special treatments by the trained worker. The average time to obtain a proved bacteriological cultural cure was nineteen weeks—that is, because we sent them away for a time and usually brought them up for these tests after each monthly period.

This shows that it does not take an unreasonable time or an unreasonable number of treatments to effect a cure in a case of gonorrhoea in a woman, and will bring hope to those who start on this quest.

Out of 650 cases sent up for examination, 382, or 59 per cent., were proved not to harbour the gonococcus. To be able to prove that a woman does not harbour the gonococcus is of just as much value both to the individual, the family, and the State, as the converse. It has long been widely taught and held that it is not possible to state whether a woman is infectious or not. This bogy should now be finally laid to rest. If careful examinations are made as outlined in Chapter I, and they all prove negative, it is a fair and practical assumption to make that the woman is not infectious. Occasionally a mistake will be made, but so seldom that for practical purposes such mistakes will be of little importance. It is absolutely impossible to state that a woman is or is not infectious after one examination only. Any one who professes to do this is making a false and impossible pretension to knowledge. Yet in the course of practice you will usually find that a woman who is accused of giving a man gonorrhoea goes off to some practitioner, and states that he has made a single examination of the vaginal discharge alone, and that he certifies her as free from disease. No male and no doctor should attach any credence to such reports. They are worthless and usually are made to try and hide the woman's culpability. The woman really knows she is infectious and is trying to bluff. Women are far more non-moral with regard to spreading venereal disease than men. If a man knows he has gonorrhoeal disease he usually does his best to get rid of it, and does not knowingly spread it. A woman, so long as she has no painful symptoms, simply does not worry, but goes on her immoral way without caring how much she spreads the disease.

The infected nymphomaniac is the worst spreader of disease, and is the person reformers should get hold of and cure.

Most of these 382 women were suffering from non-specific vaginal discharges kept up by a non-specific cervicitis. In 100 cases the causes of cervicitis were analysed. Seventy-five per cent. of these cases were discharges occurring in the course of pregnancy or after parturition or miscarriages; 12 per cent. were due to prolapse; 4 per cent. were due to fibroids of the uterus; and 3 per cent. were the after-effects of gynaecological operations, chiefly dilatation of the neck of the womb, followed by curettage.

It is our distinct impression that dilatation of the neck of the womb followed by curettage of the uterine body is not nearly such a safe procedure as is generally taught. Our impression has been that the rule holds in gynaecology, 'When in doubt, curette'. Curettage may not infrequently be followed not only by obstinate streptococcal discharges, but even by dangerous infections of the pelvic cellular tissue, the ovary, tube, and peritoneum. In our opinion it should be looked upon as being as difficult and dangerous as a major operation, and only to be carried out after due consultation and by expert hands.

Twenty-four of these women had secondary syphilis, so that out of 650 women seen in both groups, forty-four, or 7 per cent., had got syphilis in an active stage.

A moderate number of these women had got *Bacillus coli* pyelitis and cystitis, but it was interesting to note how seldom this type of case was sent down to our department.

Thirty-four of these women came up because they suspected their husbands of harbouring disease. They were all proved to be non-infected. Three came up to be examined because their children had it. Five came up and stated that they had been raped; all were pregnant but none diseased. One young girl came up and stated that a boy friend had inserted a toy gun; she was not infected by the miniature weapon. Another girl came up because her brother had 'interfered' with her. Two came up because their fiancés had got disease; they were not infectious. One came up because her mother had it, another because her daughter was attending for it, one because her husband accused her of having it; one because her husband had

rheumatism. Two came up 'because of baby's eyes', and were found to be not infected. Three came up because they had been reading the lurid advertisements inserted by the Societies in the Sunday papers. Immediately the power of suggestion gave them burning micturition (phosphaturia from worry). They were found to be quite healthy except as regards their dirty little minds. We call this 'propaganda' disease. We see a great deal of it, especially in private practice. People come up and insist that they must have venereal disease because of all sorts of absurd feelings experienced after reading the anti-venereal disease campaign literature. Even the most careful and minute examinations fail to convince some of them that they are not 'social lepers', and not infrequently they threaten suicide.

Great harm has been done by the Societies in using 'Fear' as the watchword in trying to combat disease. Were 'Fear' to be put aside as an unworthy and dangerous emotion to raise by propaganda advertisement and mass suggestion, and for it to be substituted an attempt to hold up the ideals of love for others, unselfishness, respect for others, and even mere cleanliness and decency, then we should not get so much of this propaganda disease. For purposes of striking fear into sinners the Societies have enormously exaggerated both the dangers to life of this disease and the difficulty of cure. These diseases are seldom dangerous to life, and nowadays they can be cured. It is a wicked thing when pious busybodies start 'propaganda disease' amongst a population. 'The good hate to sin from love of virtue, the bad hate to sin from fear of punishment.' These wise words of Horace should be written up in the halls of all 'hell-fearing Christians'.

Two cases were due to dirty douching. Two cases came up because of joint trouble, which was shown not to be due to the gonococcus. A large number of cases were simply cases of vaginitis due to uncleanliness and skin parasites. They also suffered from impetigo or warts. One case was a girl of 15 who came up with a vaginitis set up by her first attempt at sexual congress. Another had been married two months and was suffering from excoriations. One woman was suffering from a paratyphoid infection of the vulva, gland of Bartholin, and bladder.

Urethritis

In 223 cases of gonorrhoea, 165, or 72 per cent., had gonococcal urethritis, as compared with 142, or 67 per cent., who had cervicitis. The urethra, then, was the commonest site in which we found the gonococcus lurking, even more so than the cervix.

The treatment employed was daily urethral irrigation during the earlier acute stages. As soon as the profuse discharge and the burning micturition had died down, additional treatment was carried out once or twice a week by means of strong urethral paints. Later on, but not in this series, we found that much time could be gained by passing urethral bougies and dilating up the urethra to 25, 30, or 35 Charrière, and by instituting strong paintings at the earliest possible moment after the acute urethritis had died down.

The average time of cure of the urethra in this series was ten weeks. The quickest cure was obtained in one case after four paints. The lessons we have learnt are to paint early and to stretch early and the urethra can quickly be cured, probably in three or four weeks in the average chronic case.

Irrigation was carried out by the women themselves at first, but later they attended every weekday and were irrigated by specially trained volunteer nurses.

In only one gonococcal case were Skene's ducts found to be infected, and these were readily cured by probing with a silver-nitrate-covered probe.

In several cases para-urethral follicles, and in one case a para-urethral abscess was encountered, which yielded readily to incision and probing with a silver-nitrate-covered probe. We find that the urethra is mostly a simple tube in females, and even with regular urethroscopy it is not common to find infected lacunae or soft strictures that need special treatment. In this respect it presents a great contrast to the male urethra.

Finally, we learnt that as soon as the urethra is cured there is no need to go on treating it, even if the cervix is still infected. Go on treating the cervix till that also is cured, but in the meantime the urethra will not become reinfected from the cervix. The cervix usually takes longer to cure than the urethra. This is one line of evidence which has taught us that urethra and cervix are both infected simultaneously at the time of

the infectious act of congress. The disease does not infect the urethra first and then spread up the vagina to the cervix.

Out of 382 non-gonococcal cases applying for examination, seventy-two, or 20 per cent., had got a mild urethritis, as evidenced by the presence of pus cells and bacteria in the urethral films. Twelve of these occurred as a result of parturition or miscarriage, eleven as the result of a *Bacillus coli* infection of the bladder and kidneys, and one as a result of a similar infection with the paratyphoid bacillus. One had a true caruncle of the urethra; these are not at all uncommon in elderly women, and it is due to the fact that most of our patients were young that we did not meet with more of these. One non-specific case had a Skenitis.

In the majority of cases the exact bacteriology of the urethritis was not worked out, as little complaint was made of any urethral symptoms, and there did not always appear to be any special call for treatment. Nevertheless it is not difficult to cure these mild cases by treatment similar to that advised for specific urethritis. These cases probably correspond to the numerous cases of mild non-specific gleets occurring in the male, often the result of old cured gonorrhoea, and are best left alone if they fail to respond to a course of four to six weeks' intensive treatment. In women they seem to be largely the result of old cured *Bacillus coli* bladder infections which result in natural cure in at least 60 per cent. of the cases; or they are the result of mild vaginitis associated with leucorrhoea left after parturition, or due to uncleanliness. When the position of the urethra is considered, it is not surprising that it gets bruised and slightly purulent as the result of pregnancy.

One case had a non-specific urethritis associated with joint trouble. The joints cleared up after urethral treatment.

The regularity of attendance for treatment and the wish for cure was most remarkable when it is considered how difficult it must always be for women to attend regularly, what with the interruptions of family cares, menstruation, pregnancy or illnesses intervening, changes of domicile, and so forth.

Out of 223 gonorrhoeal cases thirty attended till they were apparent cures from film examinations only (most of them were in all probability cured), and 112 attended until we had passed them as cured after three full bacteriological culture tests made

by Dr. G. T. Western. That is to say, 63 per cent. attended till they were apparent cures, and 50 per cent, till they were proved cures. As this often meant attendance for some months, the results are a testimony to the general atmosphere of keenness engendered in the department by all concerned.

Vaginitis

Out of 223 gonococcal cases, 141 had well-marked vaginitis when first seen. This vaginitis cleared up in a few days after the cervix had been painted and the vagina swabbed out with 2 per cent. flavine. There is, therefore, little need for regular and prolonged vaginal douching in the treatment of gonorrhoea. We are accustomed to advise a saline douche (a drachm of common salt to a pint of warm water) twice a week when the woman takes out her vaginal tampon of flavine twelve hours after it has been put in place. This is simply to diminish flavine irritation. During the first week or two, if the woman is attending daily for urethral irrigation, she is given a small wash to the vagina, with the permanganate solution left after the urethral irrigation is finished. The vagina is the easiest portion of the tract to render healthy.

Out of 382 non-gonococcal cases, 253 had a non-specific vaginitis. In eighty-four of these cases in which the cause is noted, ten were due to prolapse, thirty-seven to pregnancy and parturition, two to miscarriage, two to rape, one to the excesses of early married life, seven to syphilis (condyloma, chancre), eight to fibroids, four to *Bacillus coli* pyelitis, one following a dilatation of the cervix, one the result of unclean douching by the patient to prevent conception. Finally, eleven were due to uncleanliness associated with impetigo, folliculitis, eczema of the thighs, boils, and pediculi.

It has been pointed out in the text how careless many women are of cleanliness as applied to the vulva. There is a strange fear of soaping the vulva prevalent amongst the population and handed down by tradition amongst mothers and nurses. A far larger proportion of cases of vaginitis were due to uncleanliness than are revealed by the above figures.

Three cases of 'granular' vaginitis were met with, one due to uncleanliness, one to pregnancy alone, one to pregnancy and a gonococcal infection.

Case 575 presented a most unusual phenomenon. Two congenital canals were found opening on to the posterior vaginal wall and leading from thence into the rectum. The woman had contracted gonorrhoea from her husband, and it took three months to cure her. The rectum had become infected via these congenital canals. We cured the rectum by means of daily rectal lavage with permanganate, and we passed probes coated with silver nitrate down the canals until their lumina became completely sealed up, obliterated, and free from infection.

Bartholinitis

The gland was palpable as a cyst, but no pus could be squeezed from the duct, no gonococci found; no treatment was needed in fourteen cases—nine on right side only, three on left side only, two bilateral. Of these thirteen were certainly non-gonococcal cases and were due to mild vaginitis from pregnancy, parturition, prolapse, or excessive coitus. One case had some years before had vaginal discharge, joint troubles, and fever. She appeared to be a natural cure of an old gonococcal infection and was left with an obliterated duct and a Bartholin's cyst.

A definite red macule round one or both duct orifices was seen in eight cases which were definitely non-gonococcal, five on right side only, three on both sides. This proves that the so-called macule of Sänger is not specific. It simply means that a definite purulent ductitis is present, which may or may not be specific, and needs bacteriological investigation.

Six cases of abscess of Bartholin's gland were encountered, three on the right and three on the left, in five of which no gonococci could be found in any part of the tract, but in one case gonococci were found in the urethra and cervix, though not in the pus of the abscess. Bartholin's abscess can therefore arise entirely apart from gonorrhoea. This was shown in a most striking manner in one remarkable case. The girl complained that for six days she had noticed pain on micturition and increased frequency of micturition and a swelling of the left side of the vagina. The urine contained pus and pure cultures of a paratyphoid bacillus. An abscess of the left gland of Bartholin was discovered and incised. The pus gave a pure culture of the same bacterium.

In twenty-six out of 382 non-gonococcal cases, i. e. 7 per cent., some pathological change was noted in the glands of Bartholin. This should help to dispose of that old bogy of the text-book, namely, that a woman with diseased glands of Bartholin must be the victim of a venereal infection. This is not so, and the fact cannot be emphasized too strongly.

In 223 gonococcal cases thirty cases of changes in the glands of Bartholin were encountered, or 13 per cent. Gonococcal Bartholinitis, is, therefore, just about twice as common as non-gonococcal Bartholinitis, but this does not justify one in any way in condemning a woman as venereal simply because Bartholinitis is present.

In nine gonococcal cases (six right side, three bilateral), the orifices of the ducts were reddened and the glands unduly palpable, but no pus and no gonococci could be squeezed from the ducts. These cases received no treatment applied to the glands themselves, yet in the majority of cases a proved cure of the infection was obtained in the course of three or four months, which shows that this sort of case needs no special treatment.

In eleven gonococcal cases, five on right, three on left, three bilateral, there was a well-marked macule, the glands were palpable and pus containing gonococci could be squeezed from the mouths of the ducts. In these cases a diagnosis of ductitis was made. The mouths of the glands were enlarged with fine probes, or slit up with a lachrymal duct probe, and this was followed in our early cases by painting the duct with pure carbolic, a process which failed. Later we found that regular massage of the gland after the duct had been enlarged often led to cure. But finally we found that the quickest cure could be effected by syringing out the glands through the ducts with 2 per cent. flavine.

Ten of these eleven cases were followed to the end and were proved as cured. One ceased to attend as she had to go to another part of the country.

In ten gonococcal cases—four on right, five on left, one bilateral—abscesses of the gland were encountered, which were opened and drained. In seven cases complete cure was obtained, in three cases the results are not known, as they failed to attend. In only one case had the abscess burst before being seen; it

had burst two years before. This case underwent excision, but she failed to attend after leaving hospital.

In one case of this series the gonococcus was present in the left Bartholin abscess alone, and could not be found anywhere else in the tract. This is a most unusual finding, as, in the majority of cases, the gonococcus is easily found either in the cervix or urethra, or both.

In three cases of Bartholinitis, arthritis was present, but in all three the gonococcus was also found in the cervix and urethra, so that we do not know whether joint infections can occur from a Bartholin's gland infection alone.

Cystitis

A certain number of the non-specific cases were suffering from chronic *Bacillus coli* cystitis, and pyelitis. These were referred to the cystoscopic section of the genito-urinary department for renal lavage.

Only one case of proved gonococcal cystitis was met with. This cleared up spontaneously after rest in bed and the exhibition of sandal-wood oil and alkalis. Yet the majority of these cases had urethral and vesical lavage. This shows the fatuity of those who criticize vesical lavage, on the ground that it is dangerous and will spread the disease into the bladder. This statement is only made by practitioners of the old school who have never tried it, and who have, therefore, no facts whatever on which to base their *a priori* criticisms. The fact is that the bladder mucous membrane is almost immune to a gonococcal infection. This is a natural immunity, one which we cannot explain, but should thankfully accept.

Gonococcal pyelitis did not occur. I have never seen it in a woman. I have only seen two cases in men, both of which I have published in full in my book, *Common Infections of the Kidney*. There are barely fifty cases of proved gonococcal pyelitis in the literature.

Cervicitis

Out of 223 gonococcal cases seen in adults, 142 had a specific cervicitis, or roughly 63 per cent. Twenty-one of these were in various stages of pregnancy when first seen. These received regular treatment applied to the cervix and were all cured

before they reached parturition. This saves all risk to the baby's eyes, and also prevents the ascent of the disease to the tubes, with consequent sterility. The disease rarely spreads to the tubes unless pregnancy supervenes. *If gonococcal cervicitis is treated during pregnancy and cured, gonorrhoea ceases to be a cause of sterility or of one-child marriages.* This is an axiom of the utmost importance.

Treatment of the cervix during pregnancy does not lead to abortion. Out of twenty-one cases treated, abortion only occurred in one, or 5 per cent. The others went safely to term. This is a further axiom worthy of note.

Forty-eight cases, or 20 per cent., had erosions. *The appearance of erosion simply means a chronic cervicitis.* It does not mean a specific cervicitis, as erosion occurred in 113 out of 382 non-specific cases, or 40 per cent. *Erosion was therefore twice as common in non-specific as in specific cases.* Erosion seen in a gonococcal case simple means that the woman has had it for a long time, probably some months. This point may thus be of value in determining whether a woman has given it to a man or vice versa, and might assume medico-legal importance. The student is, therefore, advised to make himself well acquainted with the appearance of erosion, and if seen always to make a written note of it at once and be careful to date it.

In twenty-three cases the gonococcus was not found in the cervix when it was present in the urethra. The gonococcus lingers longer in the urethra than in the cervix in untreated cases. In treated cases the gonococcus can be made to leave the urethra quicker than the cervix. When it has been made to disappear from the urethra and still lingers in the cervix, it does not return to the urethra, though that receives no further treatment.

Rather less than half the cases got well on the application of flavine 2 per cent. to the cervix. Rather more than half needed the application of stronger chemicals, such as iodized phenol.

The average number of treatments required (given twice a week) to effect a cure was twenty-three. That is to say, treatment needed for cure took, on an average, eleven weeks or nearly three months. (We have since found that this period can be very considerably shortened in private cases by putting

the patient to bed and carrying out the treatment at shorter intervals, three times a week at least, and, in some cases, even every day. In this way we have been able to obtain cures in three or four weeks, or even less.) In some of our hospial patients with complications, such as joint infections, we have lately been able to do this intensive treatment by taking them into hospital, with highly satisfactory results.

The longest case in our records took fourteen and a half months to cure, but here we were suspicious that constant re-infection took place at home.

Non-Specific Cervicitis

Out of 382 non-specific cases 203, or 70 per cent., had a non-specific cervicitis. Cervicitis is, therefore, a very likely cause for a persistent leucorrhoea. One hundred and thirteen, or 40 per cent. of these, had well-marked erosions. Erosion simply means chronic long-standing cervicitis, and is twice as often non-specific as specific. The erosion seen in young girls is sometimes due to masturbation, or it may be of the congenital variety.

The causes for cervicitis were determined as follows:

Fourteen per cent. due to tears after parturition; 6 per cent. due to miscarriages; 60 per cent. due to pregnancy and parturition without tears; 12 per cent. due to prolapse; 7 per cent. due to septic fibroids; and 1 per cent. due to gynaecological operations, chiefly dilatation of the cervix.

Only three cases of carcinoma were encountered. One of them had gonorrhoea as well. This is interesting, as showing that the symptoms of which carcinoma victims complain to the receiving-room officers, put them on the right track in the majority of cases, so that they get referred straight away to the gynaecologist.

Four cases of primary chancre of the cervix were seen and diagnosed by means of film preparations.

We became expert in the diagnosis of early pregnancy from inspection of the cervix. After six weeks the cervix appears swollen and of a peculiar bluish colour, it is also quite soft and no longer firm to the touch. We feel that it is possible to determine pregnancy by inspection of the cervix, anyhow at the second month and probably a week or two earlier.

In several cases we found spermatozoa in our films made of the cervical secretion though congress had not taken place for at least a week.

Uterine, Tubal, and Ovarian Complications

Two cases exhibited parametritis. One was a non-specific case following parturition. The other was a woman with extraordinarily low resistance to the gonococcus. She had a specific parametritis and a specific cystitis, and was extremely ill. It took four months to cure her.

In fifty-five cases there appeared to be evidence of metritis. These were all non-specific cases, mostly cases following parturition or miscarriage.

Eleven cases of fibroids were encountered. Two of these had gonococcal cervicitis and one gonococcal urethritis and non-specific cervicitis.

Eleven cases only out of 223 gave any evidence of infection of the uterus and tubes with the gonococcus. *This is an observation of profound significance.* Three of these cases had already had operations performed for removal of inflamed tubes. They cleared up quickly.

In five cases the inflamed tubes subsided naturally and gave no further trouble. Evidently natural repair and death of the gonococci by encapsulation took place, as the disease was readily cured without any need for tubal operations.

Three of them failed to attend their full course, so that we do not know what happened to their tubes in the end.

We can, therefore, make certain provisional conclusions as a result of our observations.

Uterine and tubal complications of gonorrhoea in cases treated early and consistently are rare (less than 5 per cent.). They seldom occur except in cases that are also pregnant, and where the pregnancy is allowed to go to term before the case is cured. In such a case the baby is born but is quite healthy if it receives prophylactic eye treatment. The public is apt to mix up syphilis and gonorrhoea in this respect. They do not understand that a baby born of gonorrhoeal parents is quite sound constitutionally. Parturition is followed by salpingitis which may seal one or both tubes. Hence untreated gonorrhoea

is liable to be the cause of one-child marriages, not of complete sterility as is often stated.

The lesson is: Treat gonorrhoea vigorously during pregnancy and cure it. Then salpingitis will not occur, and sterility will be avoided. Treatment seldom leads to abortion.

Tubal complications should, therefore, seldom occur in treated cases. All the cases of tubal infections we encountered had arisen before they came up to see us. No cases of tubal infection occurred in any case under treatment.

If tubal infections are present, remember that in the majority of cases they will subside naturally. The behaviour of an inflamed tube appears to correspond to that of an inflamed testicle. The gonococcus becomes encapsuled. Once encapsuled it tends to die out naturally. Hence the fact that cultures made of tubes removed at operation are usually sterile.

Operation is seldom necessary in acute gonococcal salpingitis. Operation is only necessary in cases of 'chronic relapsing salpingitis'. These are cases where there is evidence of chronic salpingitis and the treatment applied to the cervix or uterus fails to cure. The cervix becomes constantly reinfected from above. In this case it is justifiable to cut down and remove the offending tube or tubes. There appears to be no need to remove the uterus, which is usally enlarged, soft, and inflamed, unless both tubes need removal. Removal of the infected tube or tubes is soon followed by cure of the cervix. Though we did not have to operate in any of our first 650 cases, yet we have had to do so in a few of our later cases and in some private cases. Experience has, therefore, taught us the lessons given above. Certain of our specific cervical cases have certainly at one time had inflamed tubes, to judge by the history. But clearly in these the tubal trouble had long before subsided and the tubes become sterile.

Arthritis

The figures and facts obtained from an analysis of cases of arthritis are given in full in Chapter VIII, so they need not be repeated.

Iritis

One case of gonococcal iritis was seen out of 223 cases. This case had no arthritis, which is unusual, and cleared up quickly

after treatment of the infected cervix. The urethra was not infected.

One case of irido-cyclitis secondary to a *Bacillus coli* cervicitis was seen, which cleared up on cervical treatment. We have seen a similar phenomenon in a private patient.

Ophthalmia

Not a single case was seen in adults, which corresponds to our experience in male subjects. Gonococcal ophthalmia in adults is so rare as to be almost a bogy. It is right to warn patients as to the danger of carrying infection to their eyes, but the event seems a very rare one.

Proctitis

This occurred definitely in one case only, the case mentioned previously where two congenital tracks were found leading from the vulva to the rectum. This cleared up quickly on irrigation of the rectum with permanganate.

Danger of infecting the rectum from discharge flowing out of the vagina has long been a bogy of the text-books. It is shown to be so rare a phenomenon as not to be worthy of much emphasis. This corresponds to our experience in male subjects. We have only met with one case infected by an orderly's finger in carrying out prostatic massage, and one due to direct implantation from the penis. Nevertheless, it is a good rule never to employ enemata in cases suspected of gonorrhoea.

Children

Out of 650 cases, fifty cases of gonorrhoea in children were met with. That is to say, one case in every thirteen is a child, or, roughly, 8 per cent. Most of these children were under 8 years old, but three, being at the age of puberty, came to be included in both lists. Only one of these children had acquired syphilis, a child aged 6 years who had been raped. She had condylomata of the vulva and a secondary rash. Only one case had congenital syphilis. Congenital syphilis is becoming a rare disease. Owing to the venereal clinics syphilitics get treated well and early nowadays. Well-treated syphilitics do not produce syphilitic children, even though they give positive blood tests.

Only two children gave a history of rape. American authorities state that rape by adults is a common cause of gonorrhoea in children. They state that it is due to a persistence of the old tradition that congress with a virgin will cure gonorrhoea. The man, therefore, selects a child as the only hope of finding a virgin. This may be true of American social life, but the tradition is evidently dying out amongst the English working-classes.

These infections appear to take place in children owing to the conditions of overcrowding that obtain in certain areas in the East End of London. These children often sleep in the same bed as their parents. They use a common towel, common soap, a common sponge, and a common lavatory. We have had whole families up for investigation, as it is useless treating a single child in a family without investigating all the other members. Otherwise reinfection occurs again and again. Most interesting have been the results obtained. We have not yet found a family in which all the members were suffering. Usually it is the father or the mother and two or three of the children. In some cases the parents are quite free, then it is found that brothers and sisters have it. In some cases we have traced it to children of one family playing with infected children of another family.

Some have supposed that the vulva becomes infected at the birth of the child, just as in the case of the conjunctiva. We could find no evidence to support this idea.

The disease in children is usually confined to the vulva. It tends to linger about the folds of the vulva.

In only five cases did we find evidence of urethritis, and in only one case of cervicitis. American writers state that proctitis is common and is the cause of the tendency to relapse. We could find no evidence to support this statement. The gonococcus is able to cling to life in the vulval mucus in the most extraordinary manner. A few exceptional cases appear clinically to be quite cured after a few weeks' treatment, and indeed films made of the vulval and vaginal secretions may not show the gonococcus; yet when cultures are made again and again and for many months, the gonococcus continues to grow freely in culture. Children can, therefore, carry the gonococcus without any physical signs. They become true 'carriers'. In one case we utterly failed to cut short this 'carrying' tendency after

nearly two years' treatment (297), but in this case we could not definitely exclude reinfection.

We have an idea that these carriers may undergo natural cure at the onset of puberty when the vaginal secretion takes on its more acid character.

TREATMENT.—We soon gave up daily douching in children, as it proved useless. We employed paintings applied to the vulva and vagina, mopping out carefully all the folds and recesses. We tried various agents, such as eucalyptus 10 per cent. in olive oil, protargol 4 to 10 per cent., lactic acid, silver nitrate, acriflavine 2 per cent. in saline. Finally, we learnt that the best and quickest results could be obtained by painting daily with 2 per cent. acriflavine in salt solution. This seldom causes any irritation or soreness, and the vulva cleans up quickly in response.

It is as well to test the urethra in all cases. In only five did we find it infected. These cleared up in a few weeks after the application of silver nitrate grs. v–xx to the ounce applied by means of a cotton-wool applicator to the urethral channel. We are now inclined to paint the urethra as a routine in all cases.

The average time of apparent cure for all the cases was four months. This gives a wrong idea of the difficulties. Many cases cleared up quickly in a few weeks, but the average is weighted heavily with a few resistant cases that lasted many months, sometimes a year or more. Probably some of these cases were constantly being reinfected at home, as we could not always get hold of the rest of the family and treat the infected members.

If the trouble lasts for more than three or four months we now give an anaesthetic and inspect the cervix with a tiny Cusco speculum. In one case we found a red spot on the mouth of the cervix containing gonococci. We painted this with silver nitrate (grs. xx to ʒi) and the trouble cleared up.

The attendance was extraordinarily regular. Thirty-six out of the fifty cases attended to the end for their three full cultural tests, and were proved to be cured. Some of the others were apparent cures. We only failed to cure one case that attended regularly. That child appears quite well, but we can always grow gonococci from the vagina, however healthy it looks. It is probably a true carrier, though we suspect reinfection at home.

Two cases had arthritis, both from a vulvitis alone. One cleared up quickly with vulval paints, the other failed to attend for treatment. The first had an infected knee, wrist, and ankle and also ophthalmia. These all cleared up in three weeks. We only met with this one case of ophthalmia in the 650 cases.

In three other cases the mother came up with gonorrhoea, and we found that her last child had been treated in other hospitals for proved gonococcal ophthalmia. Gonoccoccal ophthalmia is becoming a rare complication. Complications in children are, therefore, very uncommon. The disease is mostly confined to the vulva, is produced by infected sponges and towels, is hard to cure, as it is so difficult to be sure that reinfection in the home is not taking place. In private cases we have met with little difficulty in curing the cases quickly, as intelligent daily treatment can be carried out and the whole family inspected and, if infected, treated as well.

Non-Specific Vulvitis in Children

Twenty-four cases were examined and found to be non-specific.

Many children have a mild mucoid excess and are brought up for examination. Young girls approaching puberty have a sexual congestion of the vagina and exhibit an excessive, highly acid vaginal secretion. This does not contain pus, is in no way pathological, and is simply an increase of lubricant. It should receive no local treatment, and the attention should be distracted from it as far as possible. Sixteen of these cases had vulvitis due to uncleanliness, two had tuberculous ulcers, one was a case of excoriations from rape, and one was a child who had indulged in her first attempt at congress. Dirt is a common cause of vulvitis in children. These children have pediculi, or scabies, or both, scratch themselves, and develop excoriations about the genitals which lead to streptococcal impetigo, with the formation of crusts and superficial ulcers. They also exhibit eczematous patches spreading on to the inner side of the thighs with clearly defined edges. This clear-cut eczema on the thighs nearly always means a non-specific dirt vulvitis. When we see it we do not expect to find gonococci. Such cases usually show enlarged glands in the groin, and may develop boils and folliculitis. One child had an abscess of one labium which needed

incision. A boy had inserted a toy-gun in the course of play and this was the result.

Reinfection

One case seen and cured was reinfected five years later by her husband while he was attending a venereal hospital. One case was cured, but turned up four months later, having been reinfected by the same 'friend' who had infected her before. She accounted for her foolishness by alleging that he had drugged her with chloroform. Another woman attended with her two children and we cured them all. We wrote to the husband and he refused to come up for treatment. She soon returned reinfected, but not the children, which shows the importance of getting hold of the whole family. One woman was pregnant but did not harbour the gonococcus, yet she had had relations with her husband one week before, and we knew that he was suffering from active gonorrhoea. This illustrates a point I have made before in my previous book on the male, namely, that a man with gonorrhoea may go with a healthy woman and not give her the disease, and vice versa. In fact, my experience goes to show that disease is only implanted by an infected man or woman in about one out of six contacts. It is surprising to find how many women came up to be examined because their husbands were being treated for gonorrhoea and yet how few were found to have developed the disease. Seventy-one married women applied in this way ; thirty-seven had gonorrhoea, thirty-four had not. Some of these women had heard that their husbands had been astray, which drew their attention to an old chronic vaginal discharge, and they came up for examination. Usually these are non-specific and are due to repeated pregnancies.

Excoriations

These are met with under varying circumstances. They are seen on the outer surface of the cervix after prolonged and exciting coitus in young girls or newly-married women. They are also seen on the cervix as a result of masturbation with foreign bodies. Excoriations are also met with in such cases round the vulva and entrance to the vagina. They are also seen in children as a result of scratching, or from the introduction of foreign bodies in the course of play.

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PRINTED IN GREAT BRITAIN AT THE UNIVERSITY PRESS, OXFORD
BY JOHN JOHNSON, PRINTER TO THE UNIVERSITY

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